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A Technological History of Municipally Owned Public Transportation in Edmonton, 1893-1981

by

George H. Buck

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Motorbuses

Introduction

Following the end of the First World War, several automobile manufacturers developed motorbuses which were proven to be reliable enough for urban transit service. By the early 1920's, several North American street railways had begun operating some sort of motorbus service to supplement their street railway service. (Miller, 1940, p. 154) The major advantage of a motorbus over a streetcar was that a motorbus did not require an elaborate and costly fixed roadbed. In addition, the routing of a motorbus could be altered daily if required. Costly re-laying of streetcar track was necessary to alter a streetcar route. The motorbus of that period, however, possessed several disadvantages. They could not carry as many passengers as most double truck streetcars. The motorbuses, as well, required more frequent and more elaborate maintenance than most streetcars. It should be noted that the internal combustion engines of that era and their drive systems possessed a far greater number of moving parts than the motors and control equipment of electric streetcars of that era. A motorbus, however, could be more economical to operate than a streetcar on routes with low ridership and poor track.

It has been mentioned in previous chapters that several ERR stub lines had been unremunerative since their construction. These lines included the track along 76th Avenue between 104th and 116th Streets, commonly referred to as the McKernan's Lake line, and the short stub line along 102nd Avenue between 124th and 142nd Streets. (Edmonton Official Gazette, April 9, 1914, p. 61; see also Chapters III & V) In

September 1928, SRD Superintendent W. J. Cunningham reported to the City Commissioners that he was in favor of abandoning streetcar service along 76th Avenue and replacing it with a motorbus because that line had perpetually lost money as the result of low ridership. In addition, Cunningham pointed out that the track was in serious need of extensive repair. It was also Cunningham's intention to alter the route in order to serve the University of Alberta. Superintendent Cunningham believed that the small size of the motorbus, combined with low road maintenance costs, would reduce the yearly losses along the McKernan's Lake line. (Letter to the City Commissioners from SRD Superintendent W. J. Cunningham, September 20, 1928)

Many of the local residents in the area of the western end of the line were vehemently opposed to any change in the service. In addition to letters and a petition, the residents cited the Edmonton-Strathcona Amalgamation Act of 1912 which stipulated that a streetcar line along 76th Avenue was part of the Agreement. (Statutes of Alberta, 1911-1912, Chapter 66, pp. 529-530, and Letters and Petition from W. H. Alexander to the City Commissioners and SRD Superintendent W. J. Cunningham, December 1928-June 1929) The actions persuaded the City to abandon its plans to implement motorbus service along the McKernan's Lake line.

Superintendent Cunningham, however, continued to investigate other modes of transportation vehicles which could be used to supplement streetcar service. In 1930, Cunningham met with a H. J. Griswold who was a heavy equipment supplier. Griswold mentioned the development of the electric trolleybus in England and how it was replacing the streetcar in that country because of its versatility. (Letter to SRD Superintendent W. J. Cunningham from Griswold & Co., June 18, 1930) Trolleybuses were able to use the same electrical apparatus as streetcars but trolley-

buses did not require the expensive fixed roadbed that streetcars required.

In 1931, the City again decided to investigate the possibility of bus operations. The small stub lines had continued to lose money. In addition, other areas of Edmonton not served by streetcars desired transit service. An investigation committee was formed early in 1931 to make suggestions to the City Council. The committee consisted of Superintendent Cunningham and two aldermen. (Canadian Railway and Marine World, March 1931, p. 171) By July, the committee had recommended that motorbuses replace the existing streetcar service along 102nd Avenue and that a motorbus route be implemented between the 109th Street streetcar lines and the buildings of the University of Alberta. During this time, the tracks on the High Level Bridge were undergoing extensive repairs so streetcar service across the bridge was temporarily suspended. To keep passenger inconvenience to a minimum, a temporary motorbus service was operated across the bridge until the track repairs were finished. The temporary bus service provided the committee with an excellent opportunity to observe closely urban bus operation. (Canadian Railway and Marine World, July 1931, p. 478)

In August, the City Council decided to invite tenders for motorbuses. The buses would be used to replace streetcar service along 102nd Avenue. The buses would also be used on a new route which would link the University with main streetcar lines. (Canadian Railway and Marine World, October 1931, p. 667) The decision to abandon street railway service along 102nd Avenue was given impetus because one of the wooden bridges on that section of track was in serious need of reconstruction. (Letter to the City Commissioners from SRD Superintendent W. J. Cunningham, January 27, 1932) In order to rebuild the bridge, streetcar service would have to be suspended or diverted. The cost of constructing a street

railway diversion would have been extremely expensive compared to the cost of operating a motorbus.

In a report to City Council, Superintendent Cunningham pointed out that recent advances in transportation technology, such as the trolley-bus, were beginning to make the use of streetcars obsolete. (Canadian Railway and Marine World, November 1931, p. 723) It would be several years, however, before trolleybus operation began in Edmonton. Although trolleybuses were superior to streetcars in many respects, they were more expensive than motorbuses and trolleybuses were not widely used in North America at that time. (Canadian Railway and Marine World, p. 731)

The question of replacing streetcar service along the McKernan's Lake line again became a topic of discussion in 1931. Superintendent Cunningham still desired to alter the route and to replace the streetcars with motorbuses. The local residents, as well, were still opposed to his ideas. The City Council decided to settle the question by holding a plebiscite on November 11. In order for the plebiscite to pass (enabling streetcar service along 76th Avenue to be abandoned), a two-thirds majority vote was required from the residents on both sides of the North Saskatchewan River. The votes were recorded separately in accordance with the Edmonton-Strathcona Amalgamation Act. Although the north side voted in favor of altering the McKernan's Lake line, the plebiscite was defeated by the voters on the south side of the river. (Canadian Railway and Marine World, December 1931, p. 785) Motorbuses would not replace streetcars along that line for several years.

On December 9, 1931, Superintendent Cunningham submitted a report to the City Council which included a summary of the bids received for motorbuses as well as Cunningham's recommendations for purchase.

The report noted that most motorbuses consisted of a modified truck chassis on which was mounted a streetcar-like body. In addition, it was mentioned that buses could either be purchased as complete units or they could be purchased as a chassis only, with the body being fabricated locally. (Report to the City Commissioners, December 9, 1931, pp. 1-3) Most of the bus builders stated that their chassis would be powered by some sort of gasoline engine. One manufacturer, Seldon Motors of Vancouver, British Columbia, stated that a diesel engine would be used to power their chassis. Cunningham did not consider that bid because he believed that the diesel engine was still in an "experimental stage" and was not a proven prime mover. (Report to the City Commissioners, December 9, 1931, p. 4) Of twelve bids received, Cunningham recommended that three 25 passenger capacity motorbuses be purchased from the Canadian office of the General Motors Company. One of the units was to be complete, while the other two would have bodies fabricated in Edmonton. (Report to the City Commissioners, December 9, 1931, p. 3)

In early December the Leyland Motors Company brought a 21 passenger demonstrator bus to Edmonton in an attempt to convince the City officials that their product was better suited for service in Edmonton than their competitors' product. The unit did not remain in Edmonton for a long time. By the end of December, it had been transported to Vancouver. (Canadian Railway and Marine World, January 1932, p. 39) Cunningham was impressed with the operation and by the price of the Leyland demonstrator bus and he decided to alter his recommendations to the City Commissioners for bus purchases. The new recommendation called for the purchase of one complete 21 passenger Leyland bus and two 25 passenger General Motors chassis. (CECR No. 5, December 14,

1931) On December 30, the City Council approved the immediate purchase of a single 21 passenger Leyland bus but postponed making a decision on the chassis. (letter to the City Commissioners from the City Clerk, December 31, 1931) Motor bus operation by the SRD would begin in early 1932.

Equipment Purchases, 1932

The previous section noted that a 21 passenger Leyland bus was ordered by the City in December 1931. In order for the City to receive the bus immediately, Leyland agreed to sell the demonstrator bus to the City. This was the same bus that had operated in Edmonton for a brief period in early December. Both the bus chassis and motor had been manufactured in England, while the body had been fabricated in Montreal. The chassis was designated as "Cub", or LKP3. The chassis frame was fabricated from steel channel. The frame consisted of two side sills which were braced by several cross sills. All members of the frame were bolted together. (Leyland Motors Ltd. Specifications of "Cub" LKP3 Passenger Chassis, 1931) The frame was supported by two transverse axles which were placed near each end of the frame. The front axle, which was of forged nickel steel, was fitted with steering gear as well as drum brakes at each end. A single tube (balloon) tire and split rim was bolted to studs which were attached to the brake drums. The axle was partially suspended by leaf springs which were attached to the side of both side sills. The rear axle, also composed of nickel steel, was entirely free from the frame. The axle was held in position by two leaf springs which allowed the entire axle to undulate vertically. The centre of the rear axle contained an underslung worm-drive differential. (Leyland Motors Ltd. Specifications) A worm-drive differential

consisted of a large steel casting which housed a large diameter helical gear and differential assembly which were mounted on the axle. The housing also contained a worm gear which was held in contact with the underside of the helical gear. The worm gear was rotated by a driveshaft which connected the worm gear to a gear box. The differential enabled torque to be transmitted from the driveshaft to the rear axle. The differential also enabled each rear wheel to rotate at different speeds, a feature that was desirable when the bus turned a corner. The worm-drive differential, which was designed to be quieter in operation than other types of differentials of that time, was commonly used on trucks and buses during this period. (Specifications of Bus and Truck Chassis in SRD Superintendent Cunningham's Report to the City Commissioners, December 9, 1931) Dual balloon tires were placed at each end of the rear axle, since most of the body weight would be placed above the rear axle. (Leyland Motors Ltd. Specifications)

An inline, six cylinder water cooled engine was mounted lengthwise near the front of the chassis between the side sills. The engine consisted of a cast iron block which held replaceable cast iron cylinder liners. The cylinder head and the pistons were also made of cast iron. The oil sump, however, was cast aluminum. Aluminum was used in order to reduce the total weight of the engine. A radiator was mounted directly in front of the engine. Air was drawn past the radiator cores and fins by a four-bladed steel fan which was driven by a belt, thus cooling the liquid in the radiator. The belt was attached to a pulley which was connected to the end of the engine's camshaft. The ignition system consisted of a coil and a distributor. Spark advance was semi-automatic and could be controlled by a lever mounted on the side of the steering column below the steering wheel. An electric starter was provided with

the engine in addition to a hand crank which was connected to the front end of the engine's crankshaft. In most instances, the starter motor was used. The electrical system consisted of two 12 volt lead-acid batteries, connected in parallel, which were kept charged by one 180 W generator. The generator was driven by a belt which was attached to a crankshaft pulley at the front of the engine. A single carburetor, mounted on the cylinder head, provided the required gas and air mixture for the engine. The gas tank, which was fabricated of steel plate, was bolted to two steel brackets located on the left-hand side of the frame. The tank had a capacity of 24 imperial gallons (109 L). The exhaust system consisted of a pipe which ran from the engine's exhaust manifold to the right-hand side of the frame immediately in front of the rear wheel. A single muffler was placed in the pipe between the engine and the end of the pipe. Despite the engine's seemingly large size, it was capable of producing a maximum output of only 68 H.P. (50.7 kW). (Leyland Motors Ltd. Specifications; see also Appendix I) The engine was enclosed by a two-piece sheet steel shroud. The shroud was hinged in the middle to enable each half to be lifted so as to permit access to the engine area. Metal fenders, which were designed to shield the front tires, were also attached to the front of the chassis. (Leyland Motors Ltd. Specifications)

A manual gear box and a drive shaft connected the crankshaft and the flywheel of the engine with the differential. A pedal operated single-plate friction clutch enabled the engine to be disconnected from the gearbox. The gearbox contained four forward gears and a single reverse gear. (Leyland Motors Ltd. Specifications) It should be noted that truck and bus gearboxes of this period did not possess synchromesh features. Gear changes frequently resulted in the improper meshing

(grinding) of the gears unless the bus operator depressed the clutch pedal twice (double clutching) before trying to engage a new gear. The gear shift lever was mounted on top of the gearbox and was designed to protrude through the floor of the bus body next to the operator. (Leyland Motors Ltd. Specifications)

Hydraulically operated drum brakes were installed behind each wheel. The brakes were activated by means of a foot pedal placed to the right of the clutch pedal. A handbrake lever, mounted next to the gear shift lever, pulled two steel cables which applied the rear brakes manually. The chassis also came equipped with a single spare tire which was mounted in a cradle on the underside of the frame at the rear. The chassis also was equipped with a single automobile-type electric horn, a speedometer which was mounted on a panel near the steering wheel, a hand operated tire pump, and two incandescent headlights which were mounted on the front of the chassis to either side of the radiator. (Leyland Motors Ltd. Specifications) The chassis was shipped to Canada (where bodies were installed) in this configuration.

The body supplied with the Leyland demonstrator bus was manufactured in Montreal by the Canadian Car and Foundry Company. (Canadian Car & Foundry Co. Specifications for 21 Passenger Body for Leyland Chassis, 1931, p. 1) The construction was similar to the body construction of some of the ERR's wooden streetcars. The floor and the side framing of the bus body consisted of ash posts. The body framing was bolted to the chassis side and cross sills. The flooring consisted of tongue and groove British Columbia fir boards which were screwed to the ash framing with wood screws. The entire floor area was covered with ¼ inch (6 mm) thick linoleum. The aisle areas were also covered with a corrugated rubber matting. The roof, which was arched, consisted of basswood boards

which were covered with Number 10 weight canvas duck which was then covered with a water proofing compound. Four ventilators were also placed in the roof. (Canadian Car & Foundry Co. Specifications, pp. 1-3)

The left-hand side was framed for four windows and an outward-opening emergency door at the rear. The window sashes were fabricated of brass and were designed to lift a short distance, except for the window next to the operator and the window in the emergency door. All side windows were equipped with a removeable storm sash. The lower quarter of the operator's window was fabricated so that two glass panels could be slid open. The emergency door window was stationary, however. The right-hand side contained four windows in addition to a single-width folding door which covered a two step metal stairwell. The folding door, which was made from cherry wood, was operated by a hand lever mechanism which resembled the apparatus used on most SRD passenger streetcars. (Canadian Car & Foundry Co. Specifications, p. 1, and Photographs in University of Alberta Archives) The rear of the body contained a single fixed window while the front, which ended at the rear of the engine, contained a flat windshield angled backwards a few degrees in order to reduce glare. The area behind the engine (the dash) was framed in sheet steel which was covered with mahogany veneer. A metal sun visor was mounted above the windshield on the exterior, as well as a hand operated windshield wiper. Two small trapezoidal windows which could not be opened were also placed between the windshield and each corner post. The area between the windshield and the roof contained an illuminated roller sign in addition to two colored lenses which were located on either side. (Photograph in Glenbow Archives)

The exterior sheathing as well as the interior wainscoating and

ceiling consisted of sheet steel which was fastened to the framing with screws. Number 22 gauge steel was used for the interior, while Number 20 gauge steel was used for the exterior panels. The space between the exterior sheathing and the interior wainscoating was insulated with a layer of felt. A small rear bumper, fabricated from steel channel, protected the rear of the body from minor blows. The bumper was attached to the chassis by a small leaf spring arrangement which imparted some horizontal flexibility to the bumper. An illuminated license plate holder as well as a red stop lamp were mounted on the rear of the body. (Canadian Car & Foundry Co. Specifications, p. 2) It should be noted that while streetcars did not require licenses because their movement was usually restricted to certain types of roadbeds, motorbuses could traverse any road that could be used by any other motor vehicle. It is for this reason that motorbuses had to be licensed.

The interior seating consisted of fixed cross seats in addition to two short longitudinal seats which were placed over each rear wheel well. The operator's position was also provided with a seat. All seating was upholstered in brown leather. Ceiling mounted handrails were provided above each row of seats. The rails consisted of ash dowels which were finished to resemble mahogany. Steel brackets secured to the ceiling held the handrails in position. A single aluminum stanchion was placed to the left of the front door, while another stanchion was placed to the right of the operator. This stanchion held the farebox and a small diameter steel rod which held a canvas curtain which was used to shield the operator from the interior lights of the bus. (Canadian Car & Foundry Co. Specifications, pp. 1-3) The interior lighting was provided by six small dome lights placed in two rows of three fixtures, each row being placed above one row of seats. Each fixture contained a single 12 volt

incandescent bulb which received its power from the engine's batteries. A single radiator-type heater was placed to the right of the operator's position. This heater obtained heat from the engine's coolant which was circulated through it. A small electric fan forced air through the heater. In this manner, the interior of the bus was heated. The interior signal system consisted of a buzzer. The buzzer was activated by two spring switches which were normally open. A rope attached to each switch and strung along either side of the body above the windows enabled passengers to activate the buzzer. (Canadian Car & Foundry Co. Specifications, p. 2)

When the Leyland bus arrived in Edmonton in early January 1932, it required repainting as well as an addition to the braking system before it could be placed in service. In order to provide faster braking, Superintendent Cunningham had a vacuum operated brake booster installed on the bus. (SRD Internal Memorandum) The operation of the booster was similar to the operation of brake boosters found on many contemporary trucks and automobiles.

The bus was painted in the red and ivory (cream) color scheme that had been applied to the streetcars during that period. The red paint was applied below the windows while the ivory was applied between the red paint and the roof, which was painted black. The name "Street Railway Department" was painted in black on the centre of each side immediately below the windows. In addition, the number "1", also in black, was placed on each front corner post. (Photograph in Glenbow Archives) Once these modifications were complete and the bus was licensed, it was ready for service.

Bus Number 1 was placed in service on 102nd Avenue beginning January 25, 1932. Streetcar service along that route was terminated

on the previous day and work began on the replacement of the bridge near 131st Street. The closure of the bridge meant that streetcar operation could not be resumed if the bus broke down. Superintendent Cunningham, therefore, asked the City Commissioners to allow the immediate purchase of an additional complete bus. (Letter to the City Commissioners from SRD Superintendent W. J. Cunningham, January 27, 1932) A special meeting of the City Council on January 28 authorized the purchase of one complete bus and a General Motors chassis with the body to be built in Edmonton by the Fane Auto Works Limited. (Letter to the City Commissioners from the City Clerk, January 29, 1932) The only company which could supply a complete unit in a short time was the White Truck Company. The bus consisted of a White model 613 bus chassis on which was added a Canadian Car and Foundry 21 passenger body. (SRD Internal Memorandum)

The White chassis was similar in appearance and construction to the Leyland chassis. There were some differences, however. The differential did not employ the common worm-drive. A bevel gear arrangement was used instead and was similar to the design of contemporary automobile differentials. In addition to springs, the White chassis came equipped with hydraulic shock absorbers which were mounted by each wheel. (White Truck Co. Specifications of Model 613 Passenger Bus Chassis, February 1930) It is probable that the White chassis provided a smoother ride than the Leyland chassis because of the shock absorbers.

The body was similar in appearance to the body of bus Number 1. (SRD Internal Memorandum) When the second bus arrived in Edmonton, it was painted in a similar manner to bus Number 1. The White/Canadian Car and Foundry bus was numbered "2". (See Appendix I)

The General Motors bus chassis was designated as model U and

was designed to support a 25 passenger body. (SRD Internal Memorandum) The chassis was quite similar to the chassis of bus Number 1, in that it possessed a worm-drive differential and did not possess shock absorbers. A larger engine and gasoline tank were supplied with this chassis. The gasoline tank was designed to hold a maximum of 38 imperial gallons (173 L) of regular gasoline. A Buick inline six cylinder engine was supplied with the chassis. While the block and the cylinder were cast iron, the pistons were composed of a special aluminum alloy which provided for rapid heat dissipation. (General Motors Coach Specifications of Model U, August 1930) It should be noted that this engine was the first mechanical unit purchased by the SRD that used a light aluminum alloy for some of its moving parts. The use of lighter metals, alloys and compounds would become commonplace in future units purchased by the SRD.

The hand brake supplied with this unit operated a special drum brake which was located immediately beyond the gear box. The brake shoes were attached to the gear box while the drum was secured to the drive shaft. When the brake lever was pulled, the brake shoes would slow and stop the rotation of the drive shaft. (General Motors Coach Specifications, August 1930, p. 4) The use of a special drum for the handbrake decreased the likelihood that all braking capacity would be lost on the bus at one time.

The body for this chassis was fabricated by the local firm of Fane Auto Works Limited. The basic construction of the body was similar to that used for the Canadian Car and Foundry bodies except sheet aluminum was used for both the exterior sheathing and the interior wainscoating and the ceiling. The body, which was longer than the Canadian Car and Foundry bodies, was also equipped with two hot water heaters, one at the front and the other at the rear of the bus. (Fane

Auto Works Ltd. Tender for Motor Bus Body, January 28, 1932) The use of aluminum greatly reduced the weight of the body which, in turn, reduced the weight on the chassis and the consequent wear.

The body was painted in the same manner as buses Numbers 1 and 2. This unit was numbered "3". Plate 34 (Glenbow Archives) shows the external appearance of bus Number 3 at the Fane Auto Works upon its completion in April 1932. Plate 35 (Glenbow Archives) shows the interior view of the bus at this time. The photographer was standing near the front of the body and was facing the rear of the bus. The leather upholstered seats as well as the handrails should be noted.

The maintenance and the storage of the three motorbuses could not be undertaken by the SRD since their facilities were designed for the servicing and storage of streetcars. In addition, most SRD shop employees were not qualified motor mechanics. In order for the buses to receive the proper maintenance and storage, they were placed under the care of the Civic Garage. The Civic Garage stored, serviced and repaired the buses and billed the SRD for the costs. Painting and body work, however, were undertaken by the SRD at the Cromdale car barns. (Civic Garage Summary and Details of Operation of Street Railway Buses, 1936) It should be noted that only licensed SRD operators could drive the motorbuses. Most SRD motormen of that period could not operate the buses since many of them were not licensed to operate an automobile. (Letter to ETS Superintendent T. Ferrier from Civic Garage Superintendent A. W. Allbright, January 17, 1946)

Equipment Modifications, 1936

As early as 1935, concern was expressed over the high operating costs of the three buses. The purchase of gasoline accounted for 63%

Plate 34. (Glenbow Archives) Bus Number 3 in 1932

Plate 35. (Glenbow Archives) Interior of Bus Number 3

of the total operating cost of these buses. (Civic Garage Summary and Details of Operation of Street Railway Buses, 1936) The three buses were not very fuel efficient. Bus Number 1 travelled approximately eight miles (13 km) on one imperial gallon (4.5 L) of gasoline. Bus Number 2 averaged seven miles (11 km) to one gallon (4.5 L), while bus Number 3 could travel only six miles (10 km) on one gallon (4.5 L) of gasoline. (Civic Garage Summary and Details of Operation of Street Railway Buses, 1936) A solution had to be found to the high fuel consumption or the operating costs of the buses would become prohibitive in proportion to the ridership.

During 1935, the SRD and the Civic Garage personnel investigated developments with the diesel engine. It was discovered that the average six cylinder diesel engines which were suitable for use in motorbuses consumed approximately one imperial gallon (4.5 L) for every 18 miles (29 km) travelled. This amount represented a considerable reduction of fuel consumption compared to gasoline powered engines. In addition, the cost of diesel oil in 1935 was considerably less than the cost of gasoline. (Civic Garage Summary and Details of Operation of Street Railway Buses, 1936) In early 1936, the SRD and the City Commissioners decided to invite tenders for replacement diesel engines for their bus fleet.

Several companies showed interest but only one firm offer was received. The offer came from the Waterous Company which sold Leyland engines. The use of the English-made Leyland diesel engine in Canadian motorbuses was becoming quite widespread since there was a six month backlog of orders at the Leyland factory. (Letter to the City Commissioners from Waterous Ltd., June 15, 1936) Although the Leyland diesel engine was more fuel efficient than the gasoline engines then in use

by the SRD, the diesel engine was also extremely expensive. The City officials decided, therefore, to equip only two of the three buses with the Leyland diesel engines. Bus Numbers 1 and 3 were selected for conversion to diesel engines. (Letter to the City Commissioners from Waterous Ltd., November 6, 1937; See also Appendix I)

The Leyland diesel engine embodied many features that are found on contemporary engines. While the engine block and the cylinder head on this diesel engine were both cast iron, the pistons and the crankcase were cast of an aluminum alloy. An overhead camshaft and valve mechanism was employed to reduce the number of moving parts in the engine. The interior of the cylinder head above each cylinder was hemispherical in order to induce turbulence within the cylinder when fuel was injected. Bosch Corporation direct-type injectors and a Bosch fuel pump were installed on the engine as well. (Leyland Motors Ltd. Specifications of Oil Engine) The engine also came equipped with an integral clutch and gear box. While a starting crank was provided, the engine came equipped with a Bosch 24 volt starter motor which obtained its power from the two 12 volt batteries in the bus. It should be noted that the design of the combustion chamber described above eliminated the need of glow plugs to ignite the air-fuel mixture at any time, including starting. (Leyland Motors Ltd. Specifications of Oil Engine)

By July 1937, the SRD had concluded that the diesel engine had resulted in considerable savings in fuel costs. (Letter to the City Commissioners from SRD Superintendent T. Ferrier, July 7, 1937)

Leased Equipment, 1938-1945

The need for additional motorbuses was acute since the SRD was committed to starting new bus routes. In order to provide transit service

to the residents of the Forest Heights district, the City entered into a temporary agreement with the Bus Universal Supply Company of Alberta Limited in November 1938. That company supplied and operated two fully-equipped 21 passenger General Motors Coach (GMC) motorbuses along that route. By the end of September 1939, the company wished to have a firm agreement if they were to continue the bus service. It was apparent to the City Commissioners that the bus service was needed by the residents of the Forest Heights district. It was also apparent that the SRD did not have, and would not have in the near future, sufficient motorbuses to operate the route themselves. The City, therefore, concluded a firm Agreement with the Bus Universal Supply for their continuation of bus service with the buses mentioned previously until November 15, 1941. (Agreement between Bus Universal Supply of Alberta Ltd. and the City of Edmonton, October 2, 1939, pp. 1-4)

During 1940, an aircraft repair facility was opened near the southern end of the Municipal airport near Kingsway Avenue and 124th Street. The military authorities requested that the City provide some sort of transit service between the facility and the centre of the City. The SRD did not have a sufficient number of motorbuses to undertake this service. The City Council, following the recommendation of the City Commissioners, entered into an agreement with the Checker Taxi Cab Company during October 1940. That Agreement stipulated that the Company was to operate two buses on the route described above until six months after the conclusion of the War. (Minutes of City Council Meeting, October 15, 1940) It is not known what type of motorbuses were used by that Company during this period.

It was apparent to the City Commissioners that additional motorbuses were required if the SRD was going to be able to provide service on

any new routes.

Used Equipment, 1939

Economic constraints had prevented the SRD from purchasing additional buses after 1932. However, the SRD was in need of more motorbuses as soon as possible because of new routes and increased ridership on existing routes. In August, the Toronto Transportation Commission (TTC) informed the City Commissioners that the TTC was preparing to sell several surplus Leyland motorbuses. The SRD, in turn, informed the Commissioners that one such bus might be suitable for use as a reserve unit for the buses in regular service. The City Commissioners then employed a representative of Leyland Motors to inspect the buses and to recommend the best one for purchase. (Letter to the TTC from Commissioners R. J. Gibb, August 26, 1939) Following the inspection of the buses, the Leyland representative recommended that the City purchase bus Number 558. (Letter to Commissioner R. J. Gibb from Leyland Motors Ltd., August 24, 1939) After further inspections, the City agreed to purchase Number 558 from the TTC, and had it sent to Edmonton by rail in September 1939. (Letter to the City Commissioners from the TTC, September 1, 1939)

Bus Number 558, purchased from the TTC, had a capacity of 27 passengers, and a Leyland "Lioness" chassis and engine which were similar in construction to bus Number 1 of the Edmonton fleet. (See Appendix I) Air operated drum brakes were supplied with this bus rather than hydraulically operated drum brakes. The body of Number 558 was somewhat different from the body of SRD bus Number 1. Apart from its larger size, the body of Number 558 was constructed by the TTC and it contained a treadle-operated rear exit door on the right-hand side.

The door was opened by means of an air cylinder. (TTC Specifications of Buses 550 to 564, Excepting 557, 1939) It should be noted that bus Number 558 was the first piece of used rolling stock to be purchased by the SRD. (See Appendix I)

Upon arrival in Edmonton, the bus was repainted in a new version of the SRD's red and ivory (cream) paint scheme and was numbered "4". In addition to the red and ivory, the paint scheme was expanded to include an orange band which was bordered along the top and the bottom by thin black lines. The orange band was located immediately below the body windows and was placed around the body, with the exception of the radiator. The orange resembled Pantone ink shade 151C. (Color Photograph by H. Hollingworth, and Pantone System Matching Book, 1980) The number of the bus, painted in black, was placed immediately above the orange band on each front corner post. Plate 33 (Provincial Archives of Alberta) depicts bus Number 4 as it appeared in 1946. The placement of the orange band and the number should be noted.

New Equipment, 1939-April 1940

In late 1939, the SRD ordered one new diesel-powered motorbus from Leyland through the local dealer, Waterous, Limited. (Canadian Transportation, December 1939, p. 615) The bus consisted of a Leyland "cub" chassis with a model H2B six cylinder diesel engine. (Letter to the City Commissioners from Waterous Ltd., May 18, 1940) The body, manufactured by Smith Brothers Motor Body Works of Toronto, was described as a "transit" or "city" type. (Letter to the City Commissioners from Waterous Ltd., November 6, 1937, and Quotation from Leyland Motors Ltd., January 18, 1940)

A transit or city bus body was one in which the body extended

from the extreme front to the extreme rear of the chassis although the motor was placed longitudinally at the front of the chassis. The motor was enclosed by a removeable steel shroud and a grill placed in front of the body enabled air to reach the radiator. By designing the body in this manner, additional seating could be installed.

The body framing consisted of high tensile steel members which were arc welded together, generally. The left-hand side of the body was framed for six rectangular metal-framed windows in addition to a small fixed trapezoidal window near the front of the body. It should be noted that an emergency door was located at the rear of the left-hand side of the bus. The right-hand side, however, contained two single-width doors. The front door was placed immediately behind the front wheel, while the other door was placed immediately in front of the rear wheel. (Canadian Transportation, February 1940, p. 92, and Author's Inspection of Bus Number 5) The doors, constructed of wood, were air operated. The front door was intended as an entrance while the rear door was to be used as an exit only. Each half of the front door swung into the step well, while each half of the rear door swung out. The windshield was in two separate sections so as to conform to the curvature of the body. The windshields were kept clear of snow and rain by vacuum operated windshield wipers which were placed above each windshield section. (Leyland Motors Ltd. Specifications of City Transit Body, 1939) The vacuum operated wipers functioned in a similar fashion to the air operated wipers that were described in Chapter V. The intake manifold of the engine provided the necessary vacuum to operate the wiper pistons. The rear window, like the windshield, was also in two separate sections. Safety glass was used in the body windows to reduce the likelihood of passenger injury should a window be broken. In addition, a set of winter

sashes was provided for each body window on each side. (Canadian Transportation, February 1940, p. 92) It should be noted that while the body framing was steel, linoleum covered wood flooring continued to be used. (Leyland Motors Ltd. Specifications of City Transit Body, 1939)

The seating was arranged to accommodate 32 passengers. The seats consisted of tubular steel frames to which were attached foam cushions which were covered in brown leather. (Canadian Transportation, February 1940, p. 92) It should be noted that tubular framed seats were not as rugged or heavy as the previously used streetcar-type seats.

The exterior sheathing, including the roof, consisted of 20 gauge sheet steel. The panels were riveted in some areas, while aluminum molding strips and screws were used to secure the panels in areas prone to damage. (Canadian Transportation, February 1940, p. 92, and Leyland Motors Ltd. Specifications of City Transit Body, 1939) It should be noted that canvas was no longer being used for the roofs. This development marked a departure in bus body construction from traditional construction methods and materials that were used previously in streetcar body construction.

The headlights were mounted onto the front body panels and a small indicator or "clearance" lamp with a colored lens was placed on either side of the roller sign. The roller sign was located immediately above the windshield. Similar clearance lamps were placed at the corners of the bus at the rear. The interior lighting was also supplemented by a lamp which was placed in each stair well and a lamp mounted in the emergency door would become illuminated if the door was opened. A rear view mirror was also supplied with the bus. It was mounted on the left-hand side of the body on the front corner post. (Photographs in Corness Collection, and Leyland Motors Ltd. Specifications of City

Transit Body, 1939)

The body was painted and numbered before the bus was sent by rail to Edmonton. (Leyland Motors Ltd. Specifications of City Transit Body, 1939, p. 3) The bus was numbered "5". Number 5 arrived in Edmonton during December 1939. (SRDMR, November-December 1939)

The SRD still found itself short of motorbuses at the beginning of 1940. In an attempt to ease the shortage, in February the City Commissioners ordered an additional Leyland bus through Waterous Limited. (Letter to the City Commissioners from Waterous Ltd., February 13, 1940) The bus was identical to bus Number 5 and was numbered "6". Number 6 arrived in Edmonton during April 1940. (SRDMR, March-May 1940)

Equipment Modifications, 1940

Buses Numbers 5 and 6 were initially found to be very difficult to steer and to handle properly since the front axles of these buses tended to bounce excessively. Numerous letters were exchanged between the Superintendent of the Civic Garage and the Toronto office of Leyland Motors, with no positive suggestions coming from Leyland. Superintendent Allbright of the Civic Garage eventually corrected the steering and handling problem by altering the arrangement of the front springs so that they were more rigid. (Letter to the City Commissioners from Civic Garage Superintendent A. W. Allbright, October 23, 1940)

During this period, it is probable that external rear view mirrors were installed on all the other buses in the SRD's fleet. (Photographs by E. M. Smith) The mirrors enabled the bus operators to see vehicles passing on the left.

New Equipment, May-December 1940

The need for additional motorbuses continued despite the arrival of buses Numbers 5 and 6. In May, therefore, the City Commissioners ordered an additional, larger bus from Leyland through Waterous Limited. (Letter to the City Commissioners from Waterous Limited, May 18, 1940)

The longer chassis was designated LTB.S "lioness" and held an 8.6 L six cylinder "Tiger" diesel engine which was slightly larger than the H2B engine which had been supplied with buses Numbers 5 and 6. (Letter to the City Commissioners from Waterous Ltd., May 18, 1940) It should be noted that by this time, the Second World War had severely limited the number of ships travelling to Canada. The Canadian office of Leyland Motors, therefore, was unable to obtain some new parts for this chassis: differential, front axle assembly and the steering gear. (Letter to Commissioners R. J. Gibb from Leyland Motors Ltd., December 2, 1941) Reconditioned items that had been taken from older surplus units were used on the chassis instead of new parts. The Waterous representative of Leyland, however, had neglected to inform the City that reconditioned apparatus had been installed on the chassis. The use of reconditioned items was discovered by the Civic Garage in 1941 when the differential failed. Although the resulting unpleasantness and ill feeling between Leyland and the City caused by this incident was resolved, no Leyland motorbuses were purchased by the City after 1941. (Correspondence between Commissioners R. J. Gibb and Leyland Motors Ltd., November 27, 1941-December 16, 1941)

The body for this unit was fabricated by Smith Brothers Motor Body Works and was similar in construction and appearance to the bodies of buses Numbers 5 and 6. The new body, however, was somewhat longer.

In addition, the windshield was set back from the front a few inches (mm) to enable the windshield halves to be angled from the centre of the body towards the sides. (Photographs in Corness Collection) When complete, the body was designed to accommodate 27 seated passengers. (Letter to the City Commissioners from Waterous Ltd., May 18, 1940) The unit was painted in the standard SRD colors and was lettered "7".

The SRD required Number 7 immediately so it was imperative that the bus reach Edmonton quickly. The railroads were extremely busy because of the movement of war equipment and materiel so another method of transporting this bus to Edmonton had to be found. The City Commissioners decided to send Superintendent Allbright of the Civic Garage to Toronto where the bus was being assembled. When the bus was completed to his satisfaction, Allbright would accompany it by rail or ship to Fort William, Ontario (now Thunder Bay) where it would be off-loaded and driven to Edmonton. (Letter to the City Commissioners from Civic Garage Superintendent A. W. Allbright, October 23, 1940)

When Allbright reached Toronto on September 21, he discovered that Leyland had not modified the front suspension on that bus to reduce the front axle bounce. After the necessary modifications were made and the bus was completed, the unit was sent by rail to Fort William where Allbright received it and drove it to Edmonton, a trip which took six days to complete. Diesel fuel for the bus had to be obtained from specific bulk dealers along the route since diesel fuel was not readily available at that time. Although bus Number 7 arrived in Edmonton sooner than it would have had it been shipped by rail, it arrived partially damaged because of a slight mishap in transit. The damage, however, was quickly repaired once the unit reached Edmonton. (Letter to the City Commissioners from Civic Garage Superintendent A. W. Allbright,

October 23, 1940) This method of bus delivery was considered extremely successful. Wartime conditions prevented the SRD from receiving further motorbuses in this fashion until after the Second World War.

New Equipment, 1941

The SRD was still suffering the effects of rolling stock shortages. Three Leyland trolley buses that had been ordered in November 1939 had been delayed in manufacture and shipment by the Second World War. Ridership on the SRD had been increasing, however. In order to alleviate some of the rolling stock shortage, the City Commissioners ordered two more diesel engine buses from the Toronto office of Leyland Motors in February. (Letter to Commissioner R. J. Gibb from Leyland Motors Ltd., February 27, 1941) Leyland was able to readily supply some units since they had several chassis left in stock. The chassis were larger than either the "cub" or "lioness" chassis that had been obtained by the SRD in the past. The new chassis, which were designated LTS.8 "Tiger", were each designed to support a 30 passenger body. (Letter to Commissioner R. J. Gibb from Leyland Motors Ltd., February 27, 1941) In addition to being longer than other Leyland buses in the SRD's fleet, the chassis were equipped with air operated drum brakes which were similar to the brakes supplied with bus Number 4. (Leyland Motors Ltd. Quotation, September 8, 1941) In order to prevent the diesel fuel from becoming viscous during cold weather, the fuel tanks were designed so that a bypass exhaust pipe passed through them. The heat from the bypass pipe tended to keep the fuel warm so that it did not become viscous. (Canadian Transportation, March 1941, pp. 151-152)

Transit or City type bodies manufactured by Smith Brothers Motor Body Works were attached to each chassis. The bodies, which were

similar in appearance to the body of bus Number 7, could seat 30 passengers and had been designed for a large order of similar buses that had recently been delivered to the TTC. In addition to openable sashes on each side, small unopenable oval-shaped windows were placed above each openable sash. These small windows, referred to as "standee windows", enabled standing passengers to see outside the bus easily, thus reducing the probability that standing passengers (standees) would miss their stops because they could not see them coming. The front and the rear doors were air operated single-width folding doors. The rear door was treadle operated. Tubular seats, external clearance lamps and left-hand rear view mirrors were included with these bodies. (Canadian Transportation, March 1941, pp. 151-152)

The paint scheme was modified slightly with this order. The orange band at the front of the body swept down in a curve on either side of the radiator. A decorative curved shape in ivory paint was also applied to either side of the body. In addition, all molding strips, including those in the ivory areas, were painted black. (Color Photograph by H. Hollingworth) The buses were numbered 8 and 9, with a single number being placed in gold on the centre of the front of each bus between the bottom of the windshield and the top of the radiator grill. Plate 36 (Stan Diachuk) shows the appearance of bus Number 9 at the Civic Garage compound sometime during the Second World War. The standee windows, windshield wipers, side mirror, clearance lamps, horn and crankshaft should all be noted. Buses Numbers 8 and 9 both arrived in Edmonton by rail during March 1941. (SRDMR, March-April 1941, and Edmonton Journal, March 13, 1941, p. 13)

The three additional trolley buses did not arrive during the summer of 1941 so the SRD remained short of rolling stock. In early September,

Plate 36. (Stan Diachuk) Bus Number 9 at Civic Garage

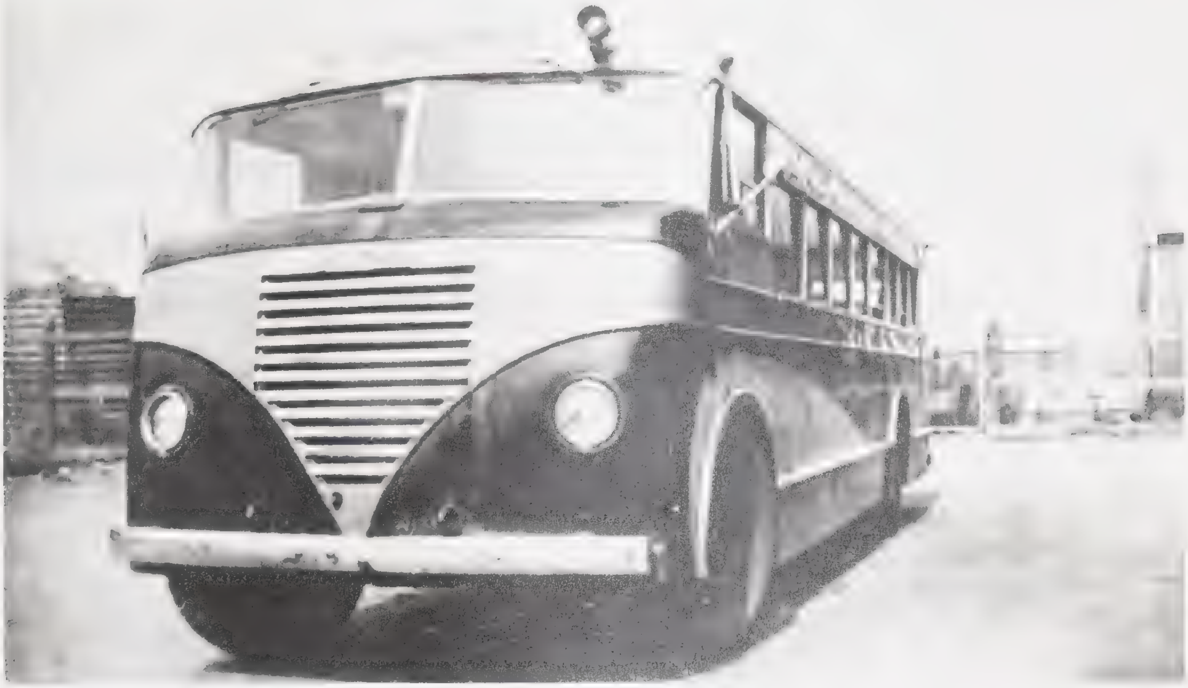


Plate 37. (Provincial Archives of Alberta) Buses at Strathcona Garage in February 1958

the City Commissioners asked Leyland Motors for a quotation on two additional "Tiger" buses similar to Numbers 8 and 9. At that time, Leyland's stock consisted of only two such units. (Letter to Commissioner R. J. Gibb from Leyland Motors Ltd., September 8, 1941) It was no longer a simple procedure for the City to purchase a motorbus. Wartime conditions had made it necessary for the Federal Government to restrict the amount of diesel fuel used by individuals and by municipalities. In order to be able to operate additional diesel buses, the City had to obtain an increase in their allocation of diesel fuel from the Oil Controller of the Department of Munitions and Supply. (Letter to Oil Controller from City Comptroller A. A. Campbell, September 11, 1941) The City Commissioners also decided that only one additional diesel bus would be necessary. (Letter to Leyland Motors Ltd. from the City Commissioners, September 1, 1941) The oil controller authorized the City to obtain the bus and the necessary quantities of diesel fuel to operate the bus. (Letter to Commissioner R. J. Gibb from Oil Controller, September 26, 1941)

The single Leyland bus, numbered "10", was practically identical to buses Numbers 8 and 9. (Photographs in Corness Collection) Number 10 was slightly heavier than Numbers 8 or 9 because it possessed larger tires. (Leyland Motors Ltd. Quotation for Vehicles, September 8, 1941) Number 10 was sent to Edmonton by rail and arrived during December. (Civic Garage Chart of Details and Costs for Street Railway Buses, 1943)

Equipment Modifications, 1942

The SRD and the City Commissioners had both received complaints from citizens about the sooty smoke which was exhausted from the diesel buses. The exhaust pipes, it should be recalled, were placed so that

the exhaust escaped immediately below the bus body near the rear wheels. Besides causing some respiratory problems, the smoke tended to soil clothing, prompting some citizens to send their cleaning bills to the City. By late 1941, at least one alderman was enquiring about what could be done to eliminate the problem. Several attempts were made by the Civic Garage personnel to add volatile fluids to the diesel fuel in the hope that the fuel would be fully combusted. These attempts did little to reduce the smoke. In consultation with Leyland Motors, the Civic Garage crews extended the exhaust pipe of some of the diesel units so that it travelled up the rear of the bus body to the roof. (Letter to Alderman S. Parsons from Commissioner R. J. Gibb, December 2, 1941) Each exhaust pipe was placed along the centre of the bus at the rear, between the two windows, and was enclosed by a sheet steel cover which was riveted to the body. (Author's Inspection and Photographs of Bus Number 5)

This modification was disastrous. Although placing the tail pipe at roof level distributed the exhaust well above street level, the increased length of the pipe allowed soot to accumulate in it when the bus motor was idling. When the bus began to move again, the accumulated soot was expelled. The soot would then settle on the roof of the bus, giving the unit a filthy appearance; or the soot would settle onto adjacent pedestrians. Instead of improving the situation, the vertical exhaust made it worse. These vertical exhaust pipes were subsequently removed and the tail pipe was arranged so that the exhaust was expelled towards the centre of the street rather than towards the curb. (Letter to the City Commissioners from ETS Superintendent D. L. MacDonald, December 6, 1966)

New Equipment, 1943-1945

Up to this point in SRD bus operations, motorbuses were purchased in which part of the bus construction was fabricated to the SRD's specifications. While the chassis were usually "stock" items, the bodies, engines and the ancillary apparatus were usually selected by or were designed by the SRD. The Second World War and the low costs of assembly line production were to curtail severely the custom fabrication of motorbuses.

By 1943, the diesel engines in buses Numbers 1 and 3 were beginning to fail frequently. Heavy use and the unavailability of suitable repair parts contributed to this condition. The SRD, therefore, wished to obtain replacement units as soon as possible. The prevalent wartime conditions meant that motorbuses were not readily available. Most large plants and factories had been converted to war production work. In addition, off-shore suppliers such as Leyland could neither manufacture nor ship units to North America. In both Canada and the United States Federal authorities were established to allocate the few motorbuses that were being produced by selected companies. (Ford Motor Co. Report on Wartime Transit Buses, 1946)

In August 1943, the City Commissioners wrote to the Canadian Transit Controller requesting three or four motorbuses to replace buses Numbers 1 and 3 and to augment the bus fleet. (Letter to Transit Controller G. S. Gray from Commissioner R. J. Gibb, August 18, 1943) The Transit Controller allocated three Ford 27 passenger motorbuses to Edmonton, with delivery to be in late 1943. (Letter to Commissioner R. J. Gibb from Transit Controller G. S. Gray, August 20, 1943) This type of bus was allocated because there were no motorbuses being produced in Canada at that time and because the American War Production Board

had allowed the Ford Motor Company to manufacture and export a number of buses of a particular type. (Ford Motor Co. Report on Wartime Transit Buses, 1946)

The Ford buses were all identical and were manufactured by the assembly line process in two Ford factories: one in Michigan, the other in Indiana. The chassis and the engines were fabricated and assembled in the Dearborn, Michigan plant. (Ford Motor Co. Photograph 74697 and Description) The chassis were then driven to the Ford body factory at Union City, Indiana where the bodies were fabricated and attached to the chassis. When completed, the buses were sent by rail to their ultimate destination. (Ford Motor Co. Report on Wartime Transit Buses, 1946. and Photograph 78361-14 and Description)

The chassis, which were fabricated of steel members, were arc welded together. A single 100 H.P. (74.6 kW) Ford V-8 gasoline engine supplied power to the rear axle. The motor was mounted transversely at the extreme rear of the chassis, with the radiator placed on the left-hand side. Spark advance was fully automatic, a combination of centrifugal and vacuum. Manual spark advance, therefore, was no longer required. The transmission contained helical gears and synchromesh devices for all three forward gears. Spur gears were used for the single reverse gear. Through a set of helical bevel gears, power from the transmission was transmitted at a right angle to a short driveshaft which was connected to a hypoid bevel gear differential on the rear axle. Long control rods connected the accelerator, clutch and the brake pedals to the respective apparatus. The engine also powered a 12 volt generator in addition to a small two cylinder air compressor. (Ford Motor Co. Specifications of Transit Type Rear Engine Bus, 1942) The placement of the engine at the rear of the bus reduced the length of the driveshaft as well as

reducing the amount of fuel fumes that entered the body of the bus. Air operated drum brakes, shock absorbers, speedometer, fuel gauge, air pressure gauge, ammeter, engine coolant temperature gauge, drive-shaft hand brake, electric horns, headlights and a single 12 volt battery were all supplied with each chassis. (Ford Motor Co. Specifications of Transit Type Rear Engine Bus, 1942)

A transit type body was attached to each chassis. The appearance and the construction of the bodies were similar to the bodies of buses Numbers 5 and 6. (Photographs in Author's Collection) The front door, however, was placed in front of the front wheels. This was possible since the engine was at the rear of the bus and it no longer obstructed the front area of the bus. No grill appeared on the front of these buses but a small ventilator was placed above the left-hand headlight. In addition, two small louvers were placed above the windshield to either side of the roller sign housing. The ventilator and the louvers could be opened during warm weather to allow air to flow through the interior of the bus. Arc welding was primarily used to assemble the body framing and to attach the body frame to the chassis. Wooden carlines were used to support the steel roof panels. The use of wood not only saved vital materials but it also absorbed some of the vibration when the bus was in operation. Aluminum foil insulation was placed between the roof and the ceiling as well as between the interior wainscoating and the exterior sheathing. The folding entrance and exit doors were on the right-hand side of the bodies and were air operated. The exit door could not be treadle operated because treadle units were not available at that time. A manually operated emergency exit was provided on the left-hand side near the centre of the body. (Ford Motor Co. Specifications, 1942, and Letter to Commissioner R. J. Gibb from Transit Controller

G. S. Gray, October 19, 1943) The seating of these buses was arranged to accommodate 27 passengers. Each bus was also equipped with: two combination tail and stop lamps, corner clearance lamps, front illuminated roller sign, interior lighting, engine compartment light, buzzer system, steel stanchions and grab handles, air operated two-blade windshield wiper over the driver's half of the windshield, interior and exterior mirrors, and two interior defroster fans located near each windshield section. (Ford Motor Co. Specifications, 1942) The complete buses were referred to as 29-B "Victory" models. (Civic Garage Chart of Details and Costs for Street Railway Buses, 1946)

It would first appear that the Ford buses represented a regression in motorbus construction because of the liberal use of steel and wood in the construction. The use of aluminum in motorbuses was curtailed during the War because it was a restricted metal, for use in fabricating military aircraft. (Ford Motor Co. Report on Wartime Transit Buses, 1946)

Heaters were not supplied with these buses but heaters were installed when the buses arrived in Edmonton. (Letter to Commissioner R. J. Gibb from Transit Controller, October 19, 1943) It is not known whether the three Ford buses ordered during 1943 were painted in SRD colors before being sent to Edmonton. The color scheme that was applied, however, dispensed with the orange band and the black borders and lines. (Photographs by E. M. Smith) The three buses were numbered 11, 12 and 13. The numbers in gold were applied to the front of the bodies in the centre. In addition, the number was also placed below the operator's window on the left-hand side, below the first window on the right-hand side and beneath the centre of the rear windows. (Photographs in Author's Collection) Buses 11, 12 and 13 arrived in Edmonton during

November and December. (Civic Garage Chart of Details of Costs for Street Railway Buses, 1943)

In early 1944, the City Commissioners queried the Transit Controller as to whether any diesel powered buses would be available since diesel engines usually required less maintenance than most gasoline engines. The Commissioners were informed that the City could purchase either additional Ford buses or similar GMC units, both powered by gasoline engines. (Letter to Commissioner R. J. Gibb from Transit Controller G. S. Gray, January 25, 1944)

The City decided to order three additional Ford units which were identical to the three already received. (Letter to Commissioner R. J. Gibb from Transit Controller G. S. Gray, April 11, 1944) Labor difficulties at Ford's body plant in Union City delayed the delivery of the buses. (Letter to Commissioner R. J. Gibb from Transit Controller G. S. Gray, November 30, 1944) Two buses arrived in December, while the third arrived in January 1945. The buses were numbered 14, 15 and 16. (Civic Garage Chart of Details and Costs for Street Railway Buses, 1946, see also Appendix I)

Equipment Disposal, 1944

The diesel engines installed in buses Numbers 1 and 3 had become extremely unreliable by 1944. Heavy use combined with the difficulty of obtaining parts from England and Germany contributed to the rapid demise of these diesel engines. By the end of July, the SRD decided that buses Numbers 1 and 3 were no longer fit for regular service. The buses were sold as complete operating units to a local mining company. (Letter to Transit Controller G. S. Gray from Commissioner R. J. Gibb, August 22, 1944)

New Equipment, 1946

Following the end of the Second World War in 1945, motorbus manufacturers could resume the production of motorbuses. On September 30, 1945, the Federal Government revoked the power of the Transit Controller, enabling transit operators to obtain motorbuses and trolley buses without consulting the Transit Controller. (Letter to Commissioner R. J. Gibb from Transit Controller G. S. Gray, September 13, 1945)

By August, the Canadian Car and Foundry Company announced that it was preparing to produce a modern city-type motorbus at their factory in Fort William (Thunder Bay), Ontario. The bus was designed by ACF-Brill Motors (formerly the J. G. Brill Company) of Philadelphia, Pennsylvania and was manufactured in Canada under license from that firm. (Canadian Transportation, August 1945, p. 453)

The SRD wished to continue its expansion of bus service (in addition to the gradual replacement of its streetcars with buses) so the Commissioners endeavoured to determine the cost, seating capacity and the delivery time of this type of motorbus. The buses were of a new design: the chassis was eliminated as a separate unit, and the motor was mounted beneath the centre of the bus, thus increasing the available space within the body. The seating capacity of these buses was to be 36 passengers, a greater seating capacity than any previous SRD motorbus. Any buses that Edmonton ordered, however, would not be fabricated until the latter part of 1946 because the Canadian Car and Foundry Company already had orders for 300 such buses. (Memorandum to SRD Superintendent T. Ferrier from Commissioner R. J. Gibb, September 27, 1945)

In December, the Commissioners placed an order for 12 of the 36 passenger buses for delivery by the end of 1946. (Letter to Canadian

Car and Foundry from Commissioner R. J. Gibb, December 1945) An additional seven buses were ordered during February 1946. (Letter to Commissioner R. J. Gibb from Canadian Car and Foundry Co., March 5, 1946)

The buses were designated model C-36. The "C" stood for city body or city service and the "36" referred to the seating capacity. (Canadian Transportation, August 1945, p. 453) A large separate steel chassis was not provided with these buses. An integral frame comprised the bus substructure. Steel channel sections and "I" beams were used for load-bearing portions of the underframe and the corner posts. All steel parts were riveted together. The framing which held the floor, sides and roof consisted of extruded aluminum alloy shapes which were riveted together with aluminum alloy rivets. The design of the substructure was such that the bus frame could not be moved under its own power without the body framing. (Canadian Car and Foundry Co. Specifications of Model C-36 Brill City Coach, 1949, p. 3) This type of unitized construction reduced the amount of material required for the bus substructure. The use of aluminum, which had been curtailed because of the Second World War, further reduced the total weight of the bus. It should be noted that this type of unitized, mass production construction had been developed during the War through the production of many types of Allied military aircraft. The C-36 motorbus represented a transferral of this technology from military uses to civilian purposes. (Canadian Transportation, August 1945, pp. 453-454)

The flooring consisted of 5/8 inch (16 mm) thick water-proof plywood which was covered with linoleum and with ribbed rubber matting in the aisle areas. Unlike the hardwood tongue and groove boards used previously, plywood was easy to install and it improved passenger safety

because of its fire-resistant properties. (Canadian Car and Foundry Co. Specifications, 1949, p. 3) Plywood was usually inexpensive compared to hardwood flooring. Two-step stairwells were provided for a single-width front door and for a treadle-operated centre exit door. The step risers were fabricated of welded steel plates. The front door step treads were made of water-proof plywood, while each of the centre door step treads consisted of a treadle. The doors were fabricated of plywood and were designed to fold when opened. Air operated cylinders controlled both the front and the centre doors. A single emergency exit swing door was provided in the centre of the left-hand side. Each side contained several windows which had extruded aluminum sashes. The windows were designed so that only the lower two-thirds of each sash could be opened. In this arrangement, the part of the sash nearest the front of the bus could be slid behind the other half of the sash, thereby allowing air to enter the interior. This arrangement prevented passengers from easily sticking their arms out of the windows. In addition, it prevented a blast of air from striking the passengers sitting behind the open window. The large height of the windows enabled standees to see outside. The rear window as well as the windshield was in two halves. Each windshield half was sloped inwards 24° in order to reduce glare. A single air operated windshield wiper was provided at the bottom of each windshield section. Safety glass was used for all windows except for the small oval-shaped windows in the front and centre doors. (Canadian Transportation, August 1945, pp. 453-454)

Sheet aluminum and some sheet steel was used for all interior panelling above the bottoms of the window sashes, while masonite was used for the wainscoating. The exterior sheathing, including the roof, consisted of sheet aluminum which was riveted to the substructure members with

aluminum alloy rivets. A fireproof insulating material 1½ inches (38 mm) thick was placed between the interior and the exterior panelling. An extruded aluminum rub rail was placed along the exterior panels below the windows. The rub rail was designed to protect the panels below the windows from minor blows and sideswipes. (Canadian Car and Foundry Co. Specifications of Model C-36 Brill City Coach, 1949, pp. 3-4)

The interior seating, which consisted of tubular seats covered with a green synthetic covering which resembled leather, also included four longitudinal seats. The interior lighting, which was arranged in a similar manner to the lighting used on other ETS buses, employed fixtures which had convex lenses that tended to spread the light from each fixture over a wide area. Aluminum stanchions and grab rails were provided with each bus. Exterior lighting included all the items described in previous sections. These buses also came equipped with flashing directional signal lamps. These lamps were placed at the rear of the bus as well as at the front. The lamps were clustered with the stop and the tail lamps at the rear; they were clustered with the parking lamps at the front. Red colored lenses covered the rear clusters, while amber lenses were used to cover the front clusters. (Canadian Car and Foundry Co. Specifications, 1949, p. 4) These buses were the first units in ETS service which possessed any form of electric directional signal. In earlier motor-buses, the operator had to stick his arm out of his window in order to inform motorists that the bus was about to make a turn.

The C-36 buses were powered by a Hall-Scott six cylinder inline gasoline engine which was located beneath the floor of the bus near the left-hand side. A hinged cover on the side of the body facilitated access to the engine. A manual transmission with three forward gears as well as a hydraulically operated single-plate clutch were also provided.

The transmission was manufactured by the Spicer Manufacturing Corporation of Toledo, Ohio. (Canadian Car and Foundry Co. Specifications, 1949, p. 10) A short driveshaft connected the transmission to a hypoid bevel gear differential on the rear axle. The placement of the engine beneath the floor of the bus near the centre enabled the weight of the engine to be more evenly distributed over the front and the rear axles than on buses with rear or front mounted engines. A 75 imperial gallon (341 L) gasoline tank was also located beneath the floor, but at the rear of the bus. An electric fuel pump was used to move the gasoline from the tank to the carburetor. (Canadian Car and Foundry Co. Specifications, 1949, p. 9) Air operated drum brakes were supplied on all four wheels in addition to a driveshaft hand brake. Both the front and rear axles were supported by leaf springs and shock absorbers. The charging system consisted of a 100 Ampere, three-phase alternator and rectifier assembly which was driven by the engine through a double V-belt arrangement. (Canadian Car and Foundry Co. Specifications, 1949, p. 8) An alternator was more efficient at producing a sufficient charging voltage at low engine speeds than a generator.

The buses were painted in a similar manner to the wartime Ford buses. These buses also had several decalcomania monograms applied to them. The monograms consisted of the letters "ETS" in yellow, surrounded by a black oval. (Letter to Canadian Car and Foundry Co. from D. L. MacDonald, February 2, 1948) The decals were applied to the front of each bus as well as to the right-hand and left-hand sides near the front. These buses were the first vehicles since buses Numbers 1 through 3 which displayed any external identification lettering. The C-36 buses were numbered 17 through 35. (See Appendix I) Following painting and lettering, the buses were sent to Edmonton by rail. (Telegrams

to the ETS from Canadian Car and Foundry Co.) Plate 37 (Provincial Archives of Alberta) shows the appearance of bus Number 33 in February 1958. The decalcomania monograms should be noted. It should also be realized that the storm sashes on the side windows were obtained after the buses had been in service for some time.

In 1946, the large increase in the bus fleet induced the ETS to construct a bus garage and maintenance facility on the west side of the Cromdale car barns. When the new garage was opened, the services of the Civic Garage were dispensed with. Some of the Civic Garage personnel, however, were transferred to the ETS so that they could continue to service the City buses. (ETSAR, 1946, pp. 1-2)

Leased Equipment, 1946-1947

Prior to the arrival of the C-36 buses, the ETS leased an additional Ford bus from the firm of McMullen and Noullett. The arrival of the new buses in December 1946 meant that the services of the leased bus were no longer required. The lease, therefore, was cancelled in February 1947. (Letter to the City Commissioners from the City Solicitor, February 12, 1947)

Equipment Modifications, 1947

The major disadvantage of obtaining a large number of identical buses from one firm was that if a particular problem developed on one unit, it was likely that the problem would appear on all other similar units. Three serious problems developed in the new C-36 buses. In cold weather the ETS, as well as other bus operators of this particular type of bus, found that the temperature of the engine coolant remained low, which severely limited the amount of heat that could be used to heat

the interiors of the buses. To alleviate this problem, the Canadian Car and Foundry Company recommended blocking the air intake for the radiator and the installation of a thermostat on the upper hose of each radiator. (Letter to ETS Superintendent T. Ferrier from Canadian Car and Foundry Co., December 11, 1946) Although these measures increased the temperature of the engine coolant slightly, the temperature was still too cold. In an attempt to minimize heat loss from the interior of the buses, the ETS ordered wooden-framed storm sashes for the side windows of each C-36 unit. (Letter to Canadian Car and Foundry Co. from D. L. MacDonald, December 24, 1946) The storm sashes did reduce heat loss but they did little to increase the engine temperature.

During 1947, Canadian Car and Foundry recommended that each engine be equipped with an underpan assembly which would enclose the engine, thereby reducing the air flow around the block. This measure was successful in eliminating the low engine temperature problem and the ETS eventually installed the underpan assembly on all its C-36 units. (Letters to Canadian Car and Foundry Co. from D. L. MacDonald, June 24, and December 23, 1947)

Another problem caused by cold weather was moisture in the air supply condensing and freezing in the door apparatus and in the air brake cylinders. The ETS solved this problem by installing alcohol evaporators in the air system. (Letter to Canadian Car and Foundry Co. from ETS Assistant Superintendent D. L. MacDonald, October 28, 1948) An alcohol evaporator was a device which mixed methyl alcohol vapors with the compressed air, thereby preventing the suspended moisture in the air from freezing in the system when it condensed.

A far more serious problem became apparent in 1947. Some of the Hall-Scott engines began to suffer catastrophic damage as the result

of piston collapse. The pistons, which were an aluminum alloy, were designed for use with high octane gasoline that would burn rapidly in the cylinders. (Canadian Transportation, August 1945, p. 454) The high octane gasoline recommended for these engines was not readily available, and the slow and uneven burning of the lower octane gasoline caused some of the pistons to deform. If the deformity was severe, the piston could push a hole through the cylinder liner, the engine block, or both. (Letter to Canadian Car and Foundry from D. L. MacDonald, June 24, 1947) The Hall-Scott Company, who manufactured the engines, solved the problem of piston collapse, by providing new substitute pistons which were heavier than the original pistons. In addition, Hall-Scott manufactured a modified cylinder head which was designed for use with low octane gasoline. (Letter to Canadian Car and Foundry from D. L. MacDonald, September 2, 1947) The piston and the cylinder head replacement program took place gradually, as each bus underwent a major overhaul.

The directional lamps on the C-36 buses proved to be such a popular and effective feature, that the ETS decided to install the same type of directional lamps, and the clustered indicator lamps on most of the buses in the fleet. (Letter to Canadian Car and Foundry Co. from D. L. MacDonald, March 3, 1947, and Photographs in Corness Collection)

Equipment Disposal, 1947

The arrival of the new C-36 buses enabled the ETS to retire some of their older equipment. Bus Number 2, which had been in service since 1932, was retired at the end of May. (ETSMR, May-June, 1947) In addition to requiring extensive repairs and rebuilding, the configuration of the body was no longer appropriate for ETS operations. Bus Number 4 was also retired. (ETSMR, August-September, 1947) The unit in

addition to having an obsolete body had become expensive to operate because of its heavy fuel consumption. (Letter to Librarian H. C. Gourlay from Mayor H. D. Ainlay, January 10, 1946) Bus Number 4 was sold to the Edmonton Public Library where it was outfitted as a "bookmobile". (Letter to the City Commissioners from the City Comptroller, October 21, 1948) The bookmobile operated in a similar fashion to the Library streetcar. (Photographs in Corness Collection)

New Equipment, 1948-June 1950

Between December 1947 and January 1950, the ETS ordered 18 additional C-36 motorbuses. (Letters to Canadian Car and Foundry Co. from D. L. MacDonald, December 8, 1947, September 8, 1948, and Letter to ETS Superintendent T. Ferrier from Canadian Car and Foundry Co., January 31, 1950; see also Appendix I) These units, numbered 36 to 53, were practically identical to the C-36 buses received earlier. In addition to the necessary engine modifications, the buses came equipped with: storm sashes, alcohol evaporators, brake interlocks for both the front and centre doors, sheet metal partitions to isolate the operator's area, an exterior plug to enable the battery to be charged without removing it from the bus, and dust shields for the brake drums. (Letter to the Canadian Car and Foundry Co. from D. L. MacDonald, December 8, 1947)

Canadian Car and Foundry also provided lift sashes instead of the older half-sliding type. (Photographs in Author's Collection) A major mechanical change was also introduced. The old system of rods and levers used to connect the operator's pedals to the engine, clutch and brakes was abandoned in favor of sheathed flexible steel cables. (Letter to Canadian Car and Foundry Co. from ETS Assistant Superintentent

D. L. MacDonald, October 28, 1948) The steel cables were supposed to enable the pedals to be depressed easily by the operator's feet. In addition, fewer parts were required with the flexible cables than were required with the older hydraulic system used for the clutch. Problems were encountered with the first units equipped with control cables because the grease they were packed with tended to freeze in low temperatures. The use of a low temperature grease solved most of the problems with the sheathed cables. (Letter to Canadian Car and Foundry Co. from ETS Assistant Superintendent D. L. MacDonald, January 19, 1949)

By the late 1940's, other bus manufacturers were producing modern motorbuses for the Canadian market. One such company was Twin Coach of Kent, Ohio. That company had a branch plant in Fort Erie, Ontario where some bus models were assembled. By assembling the buses in Canada, the company avoided paying import duties. One model that was assembled in Canada was the 44-S gasoline powered bus. (Letter to the City Commissioners from ETS Superintendent T. Ferrier, January 19, 1950) This type of bus was similar in construction and in basic appearance to the C-36 bus; but the 44-S bus possessed steel frame members rather than aluminum. The frame and the body of the 44-S was longer than the body of a C-36 bus. The 44-S unit could seat 44 passengers. (Twin Coach Maintenance Manual, 1950) The front end of the Twin Coach buses was somewhat different in appearance from the C-36 units. The windshields of the Twin Coach buses contained a lower portion which was angled so that the operator could see the road directly in front of the bus. In addition, decorative louvers were installed on either side of the front roller sign. The two-piece entrance and exit doors were supported on special lever hinges which permitted the doors to rotate as they opened. In this manner, grab handles on the inside

of the doors were made available for the passengers. (See Bus Number 82 in Plate 37)

The 44-S bus was powered by an FTC model 180 six cylinder inline engine which was manufactured by the Fageol division of Twin Coach in Kent, Ohio. The "FTC" stood for Fageol Twin Coach. The 44-S bus was also equipped with a hydraulic torque converter (a type of automatic transmission) supplied by the Spicer Manufacturing Corporation. (Twin Coach Maintenance Manuals, 1950) In addition to leaf springs, the front and rear axles were supported by large steel torsion bars which were designed to provide a smooth ride without a large number of moving parts. (Letter to P. W. Hawtin from ETS Supervisor of Maintenance S. P. Derbyshire, April 12, 1951)

The ETS ordered six model 44-S buses in early 1950. (Letter to the City Commissioners from ETS Superintendent T. Ferrier, January 19, 1950) These units were painted in a similar manner to the C-36 buses. The 44-S buses, however, were equipped with wide fluted aluminum rub rails which were polished, not painted. Three of these units, numbered 54 through 56, were driven to Edmonton from Fort Erie, Ontario by ETS employees in June 1950. (ETSMR, May-June 1950, and Edmonton Journal, June 17, 1950, p. 26) These buses were driven to Edmonton for two reasons. Firstly, it was cheaper to drive the buses to Edmonton than to transport them by rail. Secondly, by sending their maintenance employees to the factories at Kent, Ohio and at Fort Erie, Ontario in order to take special maintenance courses, the ETS could ensure that proper maintenance procedures would be followed with these units. (Letter to the City Comptroller from Commissioner D. Menzies, May 16, 1950) The remaining three units, numbered 57 through 59, were ready for delivery by the end of July. (Memorandum to City Comptroller from

Commissioner J. Hodgson, June 27, 1950)

Equipment Modifications, 1949

By mid 1948, the diesel engines on Leyland buses 5 through 10 were beginning to require expensive repairs and frequent maintenance. In addition, many citizens had complained about the odor of the diesel fumes as well as the excessive noise produced by the diesel engines. Taking these points into consideration, the ETS decided to replace the diesel engines on these buses with new gasoline engines. (Letter to International Transit Ltd. from D. L. MacDonald, April 29, 1948) New diesel engines were not considered because the ETS believed that such engines: adversely affected the riding qualities of the buses; had stronger exhaust odors than gasoline buses; were much heavier than gasoline engines. (Letter to the City Commissioners from ETS Superintendent T. Ferrier, July 15, 1948)

In early 1949, the ETS purchased two Chrysler Industrial gasoline engines along with new radiators, clutches and five-speed manual transmissions. The engine was designated model Ind. 11 (T 124). Buses Numbers 7 and 10 were each fitted with one of the new radiators and engine assemblies. The cost of maintenance and operation of the new Chrysler engines was less than the cost of operating the older diesel engines in these units. (Letter to Canadian Car & Foundry Co. from ETS Assistant Superintendent D. L. MacDonald, June 30, 1949) The ETS were so satisfied with the performance of the new Chrysler engines that they replaced the engines in buses Numbers 5, 6, 8 and 9 by the end of 1949. (Letter to Canadian Car & Foundry Co. from ETS Assistant Superintendent D. L. MacDonald, June 30, 1949, and Report on Trolley and Motor Coach Requirements, April 1951, p. 1)

It should be noted that following the conversion of the Leyland buses from diesel to gasoline, the ETS no longer operated any diesel powered motorbuses. (See Appendix I) The conversion from diesel to gasoline was a reversal of the 1936 policy which had converted several gasoline powered buses to diesel operation. Although diesel fuel remained less expensive than gasoline, the offensive odor of the diesel exhaust combined with the high operating costs of diesel engines, convinced the ETS to abandon its use of diesel engines. (Letter to Canadian Car & Foundry Co. from ETS Assistant Superintendent D. L. MacDonald, June 30, 1949)

The ETS, however, was interested in other fuels besides gasoline. The discovery of large quantities of oil and gas in Central Alberta made available large amounts of Liquid Petroleum Gas (LPG) at low cost. LPG, which is commonly referred to as "propane", is a hydrocarbon which is a product of oil and gas refining. (MacDonald, 1950, p. 2) In addition to being plentiful in Alberta, propane was inexpensive compared to gasoline and diesel fuel. (MacDonald, p. 4)

In order to use propane as a fuel for motorbuses, a special storage tank and carburetor had to be installed on the bus. In December 1949, the ETS purchased a Parkhill-Wade Company propane tank and delivery unit and installed it on bus Number 14, one of the wartime Ford units. (Letter to Allsop & Co. from ETS Assistant Superintendent D. L. MacDonald, August 21, 1950) The propane system consisted of a cylindrical steel tank with semi-elliptical ends which was welded together. The tank, designed to withstand an internal pressure of 250 pounds per square inch (1 724 kPa), could hold approximately 75 imperial gallons (341 L) of LPG. In addition to a safety valve, the tank contained a filler valve and an outlet pipe coupling. (Parkhill-Wade Co. Specifications

of Propane Delivery System, June 1950) In order for the LPG to be useable by the engine, it had to be converted back into its gaseous state. This was accomplished by passing the liquid propane through copper tubing, through a felt fuel filter to trap any suspended particles, to a regulator unit. The regulator unit, which consisted of two separate stages, served to reduce the pressure of the LPG as well as to gassify it. The liquid propane entered one end of the regulator where it encountered a diaphragm and spring controlled valve. The diaphragm was moved back and forth by the bus engine's oil pressure since the amount of propane required by the engine was determined by the engine's speed and load. If the engine was idling, oil pressure would be low and the diaphragm would not be moved. The regulator would allow only two pounds per square inch (14 kPa) of propane to pass through the first stage of the regulator. If the engine was under load, the oil pressure would be higher, so the diaphragm would open the valve and allow more propane to pass at a higher pressure. After passing through the first stage, the LPG was vaporized because of the drop in surrounding pressure. The propane gas then passed through a series of tubes within the regulator housing. These tubes were surrounded by circulating engine coolant. The coolant tended to heat the propane which vaporized any remaining LPG and also prevented the regulator unit from freezing as a result of the vaporization of the LPG.

The propane then entered the second stage of the regulator which consisted of a large chamber with a diaphragm-controlled exit valve. At this point in the travel of the propane from the storage tank to the carburetor, the pressure was reduced to a slight vacuum. (Parkhill-Wade Specifications, 1950)

The carburetor required for propane was similar in basic construction

to a single barrel gasoline carburetor. Instead of containing a float and a float bowl, the propane carburetor contained a small pipe which was connected to the carburetor's venturi. As the venturi created a partial vacuum, the resulting suction was transmitted to the second stage diaphragm on the regulator by means of a tube. The suction would cause the diaphragm to open the valve which would permit the propane in the second stage chamber to reach the carburetor. In this manner, propane reached the carburetor of the engine. (Parkhill-Wade Co. Specifications, 1950)

The propane conversion of bus Number 14 appeared to be quite successful despite an initial apprehension about increased fire hazard with propane. An accidental fire in the engine compartment of bus Number 14 in early 1950, caused by a sticking regulator valve, showed that propane was safer than gasoline since the fire did not spread and was easily extinguished. (Letter to Allsop & Co. from ETS Assistant Superintendent D. L. MacDonald, August 21, 1950)

Propane had a higher octane value than the gasoline used by the ETS at that time so the engine tended to operate without "knocking". The propoane also reduced exhaust emissions and kept crankcase oil dilution to a minimum. Fuel consumption per mile (km) increased with the use of propane. This increased consumption was offset by the extremely low cost of the LPG. (MacDonald, 1950, p. 4) The success of the propane conversion of bus Number 14 encouraged the ETS to use propane with other buses.

In order to improve the visibility of the left-hand turn indicators on all motor and trolley buses, the ETS installed a small red clearance lamp beneath the driver's window on the left-hand side of each bus. The lamp was connected to the left-hand directional lamp circuit and

was an inexpensive safety improvement. (Letter to B. C. Electric Railway Co. from ETS Assistant Superintendent D. L. MacDonald, November 21, 1949)

New Equipment, July 1950-April 1951

In the section describing new equipment obtained through June 1950, it was mentioned that three model 44-S Twin Coach buses, Numbers 57 through 59, were delivered during July. The successful use of LPG as a fuel for bus Number 14 prompted the ETS to have one of the new buses on order converted to LPG as well.

The conversion was undertaken by Twin Coach which had the Parkhill-Wade Company prepare a special conversion package for many post-war Twin Coach gasoline powered buses. (Twin Coach Propane Conversion Manual, March 1951) The bus selected for the conversion was Number 59. The apparatus was installed on the bus at the factory. (MacDonald, 1950, p. 1) Buses 57 through 59 were driven from Fort Erie, Ontario to Edmonton during July. (Memorandum to City Comptroller from Commissioner J. Hodgson, June 27, 1950)

The ETS required more buses by July and tenders were received for the supply of ten buses from the Canadian Car and Foundry Company and the Twin Coach Company. Both companies submitted tenders for trolley buses but Twin Coach also submitted a tender for the supply of propane powered motorbuses. Although the ETS had decided that the trolley bus was to be the mainstay of the fleet, Superintendent Ferrier recommended the purchase of ten propane buses instead of the trolley buses. In a letter to the Commissioners, Ferrier stated, "The motorbus becomes much more economical to operate with this fuel [LPG] and the difference in operating costs between trolley and motor coaches will,

therefore, be reduced" (August 3, 1950). Ferrier also cited increased route flexibility as a reason to purchase propane units, "The present international situation requires one to consider the use of independent vehicles so that possible new industrial or military areas may be served" (August 3, 1950).

The City Commissioners followed Ferrier's recommendation and ten propane motorbuses were ordered from Twin Coach. It should be noted that these buses were each equipped with a larger engine, the FTC 210. (Letter to the City Commissioners from ETS Superintendent T. Ferrier, August 3, 1950)

The buses, designated as model 45-S, were externally identical to buses 54 through 59. The seating arrangement of the 45-S buses was designed to accommodate 45 passengers. (Letter to the City Commissioners from ETS Superintendent T. Ferrier, April 19, 1951) The buses were numbered 60 through 69. They were completed in Canada and ETS employees drove the units from Fort Erie to Edmonton, through the United States, during December. (Letter to Burdett Oxygen Co. from ETS Assistant Superintendent D. L. MacDonald, November 15, 1950) Although the ETS saved shipping costs by having the buses driven to Edmonton, five of the buses were involved in minor mishaps before they arrived in Edmonton. (ETS Accident Reports, December 15, 1950) These accidents encouraged the ETS to search for other methods of transporting new buses to Edmonton.

An additional thirteen 45-S buses were ordered from Twin Coach in December 1950 and were driven to Edmonton from Fort Erie during April 1951 by a private delivery firm. (Freight Bills from Howard Sober Driveaway Inc., April 1951) It was less expensive for the ETS to hire the delivery firm than it was to have its own personnel drive the buses

to Edmonton. (Letter to Canadian Pacific Railway from ETS Superintendent T. Ferrier, February 28, 1951) In addition, the delivery firm undertook responsibility for any damage to the vehicles on their way to Edmonton from the factory. (Freight Bills from Howard Sober Driveaway Inc., April 1951) The buses, numbered 70 through 82, were identical in appearance to the earlier model 45-S Twin Coach buses in the ETS fleet. (See Appendix I) Plate 37 (Provincial Archives of Alberta) shows the front portion of bus Number 82 during February 1958. The design of the windshield should be compared with other buses visible in the plate.

Used Equipment, 1951

The older Leyland and Ford buses were beginning to show the effects of age and heavy wartime use by 1951. These buses had been used previously for peak hour service and were in need of frequent maintenance. (Letter to Canadian Car & Foundry Co. from ETS Assistant Superintendent D. L. MacDonald, April 17, 1951) In order to ease this situation, the ETS purchased eleven used C-36 buses from the defunct St. John, New Brunswick Power Company in April. (Contract between New Brunswick Power Co. and ETS, April 27, 1951) The buses, which had been manufactured during 1946, required new tires before they could be driven to Edmonton. A Red Deer, Alberta equipment broker, G. L. Sorensen and his firm, were hired to drive the buses to Edmonton. (Letter to Goodyear Tire & Rubber Co. from ETS Assistant Superintendent D. L. MacDonald, April 26, 1951, and Letter to D. L. MacDonald from G. L. Sorensen, May 8, 1951)

The eleven buses were repainted in Edmonton's colors and were numbered 83 through 93. (ETS Chart of Bus Licensing Details, 1953; See also Appendix I) These units resembled the other ETS C-36 buses.

(Photographs in Provincial Archives of Alberta)

Equipment Disposal, 1951

The purchase of the used C-36 buses enabled the ETS to retire some of the older Leyland and Ford buses. Increasing ridership, coupled with the removal of streetcar service, however, resulted in the ETS having a shortage of buses. The ETS, therefore, was able to retire only two of the older units. One of the Leyland buses, Number 6, was withdrawn from service and was sold to the Edmonton Public Library where it was outfitted as a bookmobile. (Forty Years of Public Service, 1951, p. 29)

The ETS also received a firm order for the purchase of their newest Ford bus. The bus, Number 16, was sold to a small interurban bus operator in British Columbia. (Letter to Canadian Trailway Stages from ETS Assistant Superintendent D. L. MacDonald, June 5, 1951, and ETS Chart of Bus Licensing Details, 1953)

New Equipment, May 1951-1952

The ETS planned to remove all streetcars from service by the end of 1951. In order to be able to accomplish this, additional motor and trolley buses were required in addition to those units already on order for 1951 delivery. The ETS received several tenders for motorbuses from different companies. The most favorable tender received was from Twin Coach which offered a 52 seat bus equipped with a propane powered FTC 210 engine. (ETS Report on 1951 Trolley and Motor Coach Requirements, March 1951, p. 1) In late April, the ETS recommended that twelve 52 seat Twin Coach buses be ordered. (Letter to the City Commissioners from ETS Superintendent T. Ferrier, April 19, 1951) The buses could not be assembled in Canada, however, because the Canadian Department

of National Defense planned to take over the Fort Erie plant for aircraft production due to Canada's involvement in the Korean War. The cost of the new buses would, therefore, be greater because of import duties. (Letter to Commissioner D. B. Menzies from Twin Coach of Canada, April 11, 1951) The Korean War also delayed the production of the buses in Twin Coach's factory in Kent, Ohio.

By mid 1951, work on the buses had not been started and the ETS was proceeding with its plans to abandon streetcar service. In order to prevent a serious equipment shortage, the ETS placed an order with the Mack Manufacturing Corporation of Allentown, Pennsylvania for six motorbuses which could each accommodate 37 seated passengers. (Letter to the City Commissioners from ETS Superintendent T. Ferrier, December 17, 1951) These buses, model C-37DT, were similar in appearance to the Canadian Car and Foundry C-36 motorbuses. The framing of the Mack C-37DT bus, however, consisted entirely of high tensile steel members which were arc welded together. The engines on these buses were six cylinder diesel units which were mounted transversely at the rear of each bus. (Mack Specifications of Model C-37 Bus, pp. 15-20) Diesel engines were selected by the ETS since propane powered engines were unavailable from Mack and because significant improvements had been made in the design of diesel engines since 1941 when the last Leyland diesel buses were purchased. (Letter to the City Commissioners from ETS Superintendent T. Ferrier, December 17, 1951) These buses were also equipped with automatic transmissions. (Mack Bus Chassis Record for Order C 371D-48)

The heating system was also improved on these units. Instead of one or two hot water heaters located within the body, a system of circulating hot air kept the interior of the bus warm. Air intake vents

were concealed directly above the windshield halves immediately below the roller sign. These vents were connected to ducts which were located between the ceiling and the roof of the bus. The ducts led to a heater compartment at the rear of the bus which was placed above the engine and was isolated from it. The air would pass through a large hot water heater unit in the compartment. An electric fan forced the heated air into two ducts which ran beneath the floor of the bus for its entire length. The pedestals holding the cross seats were designed so that they were connected to holes in the ducts. The sides of the pedestals were also perforated. In this manner, the heated air in the ducts entered the interior of the bus. Dampers within the duct system allowed cold air to be mixed with the heated air in order to moderate the temperature within the bus. Air cylinders controlled the action of the dampers. A wall-mounted thermostat located near the centre exit door controlled the operation of the dampers. In order to provide adequate air circulation, stale air within the bus had to escape. Two louvered vents located at the rear of the interior above the seats enabled the stale air in the interior to travel to the engine compartment. The air not only heated the engine compartment during cold weather, it also prevented diesel fumes from entering the bus interior because of the positive airflow out of the interior. (Mack Specifications of Model C-37 Bus, pp. 21-24)

The buses were painted in the standard ETS colors and were numbered 94 through 99. (Mack Photographs 1151C6208 and 1151C6209) The buses were driven to Edmonton by a delivery firm during November 1951. It should be noted that storm sashes were provided with these buses. (Mack Bus Chassis Record for Order C 371D-48)

The twelve 52 seat Twin Coach buses that had been ordered in April had failed to arrive by the end of 1951. In consequence, the ETS

offered to cancel its order for the buses and to re-order them when the production of the buses could be resumed. (Letter to Twin Coach of Canada from ETS Superintendent T. Ferrier, December 27, 1951) The Twin Coach Company did overcome its production difficulties and the construction of the buses began in early 1952. The price of the buses, however, was to be considerably higher than anticipated so the ETS reduced their order from twelve to eight buses. The eight buses, numbered 401 through 408, arrived in Edmonton during May 1952. (ETS Chart of Bus Licensing Details, 1953) The numbers 401 through 408 were used because numbers 101 through 299 had been allocated for trolley buses; and numbers 301 through 399 had been allocated to ETS auxiliary vehicles such as inspectors' cars. (ETS Statement of Account 22205, 1959)

The buses, which were designated model FLP-40, were identical in appearance to the 45-S buses in the Edmonton fleet. The FLP-40 buses were somewhat longer, however, and could seat 52 passengers. (Photographs in Corness Collection; see also Appendix I)

Leased Equipment, 1952

The inordinate delay in the fabrication and delivery of the FLP-40 Twin Coach buses forced the ETS to lease equipment in order to maintain adequate service on some routes during peak hours. In December 1951, the ETS finalized an agreement with the British Columbia Electric Company of Vancouver for the lease of eight of their model 41-S Twin Coach buses starting in January 1952. The eight buses were to be transported to and from Edmonton by rail. The buses could be leased until April 1952. (Agreement between B. C. Electric Co. and ETS, December 15, 1951) These buses did arrive in Edmonton and were used in service. They were similar in appearance to the Twin Coach buses in Edmonton's

fleet. (Photographs in Corness Collection) Appendix I lists some of the relevant information about these leased buses. The arrival of the eight FLP-40 Twin Coach buses in May 1952 eliminated the need for leased buses in 1952.

Equipment Modifications, 1952

In late 1952, the ETS installed two-way radios on a few of their propane-powered Twin Coach buses. The radios enabled inspectors to divert the buses from one route to another during peak hours as the ridership on the various routes increased or decreased. In this manner, the buses equipped with radios could be used to ease crowding on heavily-used routes. The use of the two-way radios was believed to be the first such installation on any Canadian municipal transit system. (Edmonton Journal, December 19, 1952, p. 1) The use of the two-way radios was not continued. It was not until the late 1970's that such equipment was installed on all ETS vehicles. (Author's Observations)

Equipment Modifications, 1954

It was inevitable that each bus would suffer damage to some of its body panels at some point in its service on the ETS. In the past, replacement panels were fabricated from sheet aluminum. It was difficult and expensive to form replacement panels for curved sections out of aluminum, however. In an attempt to reduce body repair costs, the ETS introduced the use of fibreglass reinforced resin panels in early 1954. If, for example, a curved rear panel on a bus was damaged beyond repair, a wooden mold was made of the correct shape of the panel. Layers of fibreglass cloth would then be spread over the mold and would be saturated with a polyester resin mixed with a catalyst. The catalyst

would cause the resin to harden. The fibreglass cloth provided strength to the hardened resin. When fully cured, the fibreglass panel was removed from the mold. The panel was then trimmed and was installed on the bus with either rivets or self-tapping screws. After it was painted, the fibreglass panel was indistinguishable from the aluminum or the steel panels it replaced. (Edmonton Journal, October 18, 1954, p. 21)

The fibreglass panels had the additional advantage of being resistant to corrosion and to denting. Fibreglass panels were not normally used for the replacement of flat panels since it was cheaper to use sheet aluminum as the replacement. Fibreglass was used, however, to repair and to replace corrosion damaged parts of wheel wells and step wells. The use of fibreglass as a body repair material for buses was innovative since it was believed the method had not been used elsewhere in Canada at that time. The ETS adopted the idea of using fibreglass from several automobile manufacturers who had been fabricating sports car bodies from fibreglass. (Edmonton Journal, October 18, 1954, p. 21) Fibreglass continues to be used as a repair material for the buses in the fleet of ET. (Author's Observations)

Equipment Disposal, 1954

Stable ridership levels, combined with the arrival of additional trolley buses, enabled the ETS to retire the remainder of its Leyland and Ford buses. (CECR No. 24, August 9, 1954) It is of interest to note that while most of these buses were sold, bus Number 5 was converted for civil defense purposes and was stored in the Cromdale car barns. (Author's Observations and Photographs)

New Equipment, 1955-1958

A gradual increase in ridership enabled the ETS to order ten new motorbuses during 1955. The buses were ordered from the Truck and Coach division of the General Motors Corporation and were driven to Edmonton from GM's Pontiac, Michigan factory by a delivery firm in September 1955. (ETS Listing of Buses, 1956, and Letter to the City Commissioners from ETS Superintendent D. L. MacDonald, July 20, 1962)

The buses were model TDH-5105. (ETS Listing of Buses, 1956) The "TDH" stood for Transit (body type), Diesel Hydraulic (engine fuel and transmission type). (GMC Operating Manual, 1961) The buses resembled the six Mack C-37DT buses that had been obtained during 1951. The TDH-5105 buses, however, were longer and could nominally seat 51 passengers although the seating arrangement on the ETS buses enabled 52 passengers to be seated. (ETS Specifications of Buses, 1960) The conventional leaf spring suspension system was also absent on these buses. In 1953, GMC began to equip its transit bus models with a type of front and rear axle suspension which employed a system of nylon reinforced rubber bellows which were inflated with compressed air. The bellows arrangement was designed to flexibly support the bus above the axles. (Canadian Transportation, November 1953, p. 651)

The air suspension system, as it was referred to, was simple in design and provided a smoother ride than vehicles equipped with leaf springs. In addition to the necessary support beams and channels, the underside of the bus above each axle contained two parallel lengths of hollow steel square stock which were placed near each side of the bus. Each section of square stock had both ends sealed in order to provide an air chamber inside. Each axle held two steel supports, each of which

held two bellows by means of bolts which passed through steel plates which were fastened to the ends of the bellows. The bellows, in turn, were secured to the hollow square stock on the bottom of the bus in the same manner. One of the bolts of each bellows, which was used to secure the bellows to the square stock, was hollow. Through means of two independent "leveling" or "height control valves", compressed air from the air reservoir was admitted to the two air chambers above each axle. The compressed air, travelling through the hollow bolts, caused the bellows to expand. This action lifted the bus away from the axles. When the bus had risen a pre-determined height, an arm which was connected to both the height control valve and the axle shut the air supply off to the chamber. In normal operation, the air pressure would remain inside the chamber and the bellows, thus maintaining the height of the bus above the axles. Hydraulic shock absorbers, combined with the air inflated belows, provided a smooth ride. The air suspension system could also compensate for changes in bus loads. For example, if a large number of people boarded the bus, the bellows would tend to sag because of the increased weight (mass). When this took place, the arm attached to the height control valve would be deflected. This action rotated the valve which allowed compressed air into the air chambers until the bus was raised to the correct height.

Conversely, if a large number of people left the bus, the height control valve would be rotated in the opposite direction by the arm. When this occurred, a small path was provided between the air chambers and an exhaust tube which led to the atmosphere. The air pressure inside the chambers would decrease slowly until the level of the bus dropped and the arm closed the valve. It should be noted that the height control valve incorporated a delay feature in order to prevent bumps and undula-

tions in the road from affecting the air suspension. Since rubber bellows were not strong enough to hold the axles in position, steel radius rods with neoprene bushings prevented the axles from moving out of position. (Canadian Transportation, November 1953, pp. 651-652, and GMC Maintenance Manual, 1962, pp. 291-297)

Figure 39 (after Drawing in GMC Maintenance Manual, 1962, p. 291) shows the basic apparatus and the layout of the GMC air suspension system. It should be noted that the system was easy to maintain since no parts required lubrication and the only items that were designed to be replaced periodically were the bellows and the shock absorbers.

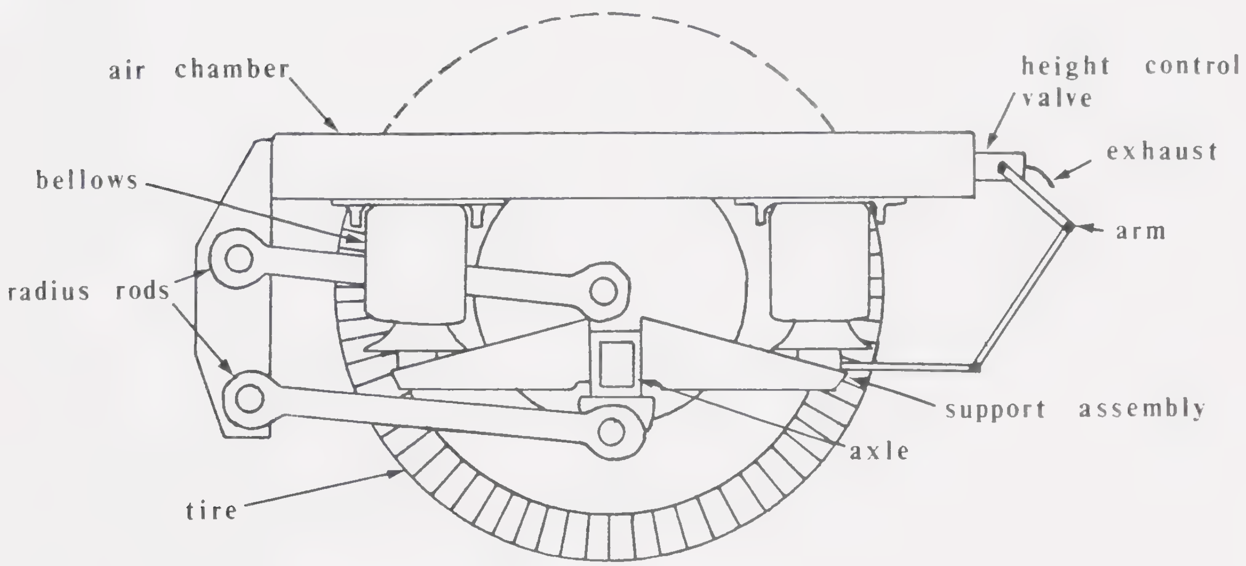


FIGURE 39. GENERAL LAYOUT OF AIR SUSPENSION

The heating system on the GMC TDH-5105 buses was not as elaborate as the heating system on the Mack buses. Air for the system was drawn in through a louver which was located above the front roller sign.

The hot air ducts were placed along the sides of the bus directly beneath the cross seats. Small openings in the ducts enabled the hot air to enter the interior of the bus. Like the Mack buses, however, the GMC buses were powered by a transversely-mounted rear diesel engine. The GMC engine was a large 188 H.P. (140 kW) six cylinder two-stroke engine in "V" configuration. (GMC Maintenance Manual, p. 265 & p. 274) The GMC 6V-71 engine was a compression ignition (CI) diesel engine like all the diesel engines used on the ETS in the past. Unlike the older diesel engine types, the 6V-71 engine had an air injection system. In all previously used diesel makes, the action of the pistons created a partial vacuum which drew air into the engine through the air cleaner. The 6V-71 engine, instead, had a gear driven blower assembly which provided some air pressure to the air reaching the engine's cylinders. This system of air injection enabled the engine to burn the fuel more efficiently, which resulted in a higher power output with fewer offensive exhaust fumes. (GMC Maintenance Manual, pp. 265-282)

The 6V-71 engine also had a provision for cold weather starting. If, for any reason, a bus was stored outside during extremely cold weather, it would be found difficult to start in the normal manner since the heat created by the piston action during starting would be drawn away from the fuel by the cold cylinder walls. The diesel fuel, therefore, would not be heated enough to cause combustion. To overcome this problem, GMC installed a small cylindrical cup onto the blower intake manifold. If the engine was to be started in cold weather, special plastic capsules of ether were to be placed in the cup. A pointed tube at the bottom of the cup punctured the capsule and allowed the ether to enter the engine. The ether was extremely volatile and usually combusted inside a cold engine's cylinders easily. In this manner, the engine was started

without difficulty in cold weather. (GMC Operating Manual, 1960, p. 14)

The buses were equipped with directional signals as well as with a left-hand side directional lamp. Each brake, tail and directional lamp possessed its own lens, unlike previous ETS buses which had all the lamps clustered behind a single lens. (Author's Photographs) The centre exit door on these buses was manually operated by the passengers. (Canadian Transportation, January 1956, p. 35) This type of door was designed to overcome some of the winter freezing problems which occasionally affected treadle operated doors. The manual push doors were normally kept closed by a solenoid controlled pin. When the bus arrived at a stop and the operator had moved the selector valve to open the centre exit door, the solenoid would be activated and the pin would be withdrawn from the doors. At the same time, a light above the door with a large diameter green lens in front of it would be illuminated. The light indicated to the passengers that they could push the door open by means of a handle attached to the right-hand half of the door. When the handle was pushed, both halves of the door would open and the passenger could alight from the bus. When the handle was released, a strong spring above the doors pulled them closed. A small air piston attached to the spring could be adjusted to allow the doors to close slowly. Once the doors were fully closed, if the selector valve was in the "doors closed" position, the solenoid pin could drop back into the doors, keeping them closed. It should be noted that if a passenger pushed on the doors while the solenoid pin was holding them shut, a micro switch would be closed which completed a circuit to an electric bell. The bell warned the operator of this condition since it was possible for a determined passenger to break the solenoid pin and fall from the bus. The operation of the

front doors, which were the folding type, was fully controlled by air operation. (GMC Maintenance Manual, 1962, pp. 39-43)

The buses were painted in the standard ETS colors except that a thin black stripe was applied to separate the red areas from the ivory areas. The buses were numbered 409 through 418 and were equipped with storm sashes. (ETS Listing of Buses, 1956) Plate 37 (Provincial Archives of Alberta) shows the front section of bus Number 415 as it appeared in February 1958.

The operation of these buses was successful and the ETS ordered an additional five units in 1956. These buses were numbered 419 through 423 and were identical to buses 409 through 418. (ETS Listing of Buses, 1956, and Photographs of GMC in Author's Collection)

An additional ten buses were required in 1958 and the Commissioners asked for bids. In addition to General Motors, bids were received from: Canadian Car and Foundry, Mack Manufacturing and Twin Coach. Both Mack and Twin Coach submitted bids for propane powered buses. Although Canadian Car and Foundry submitted the lowest bid, the contract was awarded to GMC. According to the City Commissioners, the GMC buses in operation were, "superior to any other equipment we operate" (Edmonton Journal, May 27, 1958). The Commissioners also noted that the ETS should standardize its fleet with the best equipment available since a vast array of parts would be required if the ETS continued to diversify its bus fleet. The purchase of the GMC buses was, therefore, approved by the City Council. (Edmonton Journal, May 27, 1958)

These buses, which were identical to the other TDH-5105 buses purchased earlier, were numbered 424 through 433 and were driven to Edmonton by a delivery firm from the GMC plant in Pontiac, Michigan. (Edmonton Journal, December 23, 1958)

The decision to acquire diesel buses ended the ETS program of conversion to propane operation since no new propane buses were purchased. The existing propane buses continued to be operated. (See Appendix I)

Equipment Disposal, 1957-1960

During this period, the ETS began to dispose of some of its older C-36 buses as the new GMC buses arrived. The ETS had discovered that it could sell some of its older units to smaller bus systems, thereby reducing the number of small gasoline buses in the ETS fleet. (ETS Inventory of Buses, 1966; see also Appendix I)

Equipment Modifications, 1958

The complaints about the odor of diesel bus exhausts persisted despite the introduction of air injected diesel engines. In an attempt to reduce the odors of the diesel exhaust, the ETS experimented with the addition of chemical masking compounds to the diesel fuel. It was discovered that the compound "Allmask D-1-2K" reduced the diesel exhaust odors better than other compounds. (Canadian Transportation, November 1958, p. 1) This compound was used by the ETS for several years.

New Equipment, 1960

In January, General Motors sent a demonstrator bus of their new transit model to Edmonton. The new model, TDH-5301, was mechanically similar to the TDH-5105 model but was entirely different in appearance. In addition, the new bus model contained better lighting and heating systems. (Edmonton Journal, January 25, 1960, p. 22) Although the new bus model was more expensive than the older model, the ETS placed

an order for five. (Canadian Transportation, February 1960, p. 34)

The new TDH-5301 model used some aluminum structural members, like the older C-36 buses. The external sheathing below the side windows consisted of horizontally fluted aluminum panels which were chemically treated to prevent discoloration. The rear lamp housings were fabricated of fibreglass. (GMC Maintenance Manual, 1962, pp. 25-27) It should be noted that these buses were the first new units on the ETS to have been equipped with fibreglass parts.

The windows were much larger than the windows of the older GMC buses and were shaped like parallelograms with the exception of the fixed square window in the emergency door. The large openable windows on each side of the bus were hinged at the top and could be pushed out at the bottom in the event of an emergency. Standee windows were also provided. The standee windows were covered with long strips of green colored glass which was designed to reduce the glare inside the bus from direct sunlight. While the centre door arrangement on these buses was similar to the centre doors on the older GMC buses, the front doors were similar in design to the front doors on the Twin Coach buses. The design of the windshield also resembled the Twin Coach buses except the GMC windshields were larger and possessed thinner dividing strips between the individual windshield sections. (GMC Maintenance Manual, 1962, pp. 23-32)

The heating system on these buses consisted of a large bank of hot water heaters which were located in a sealed compartment beneath the bus near its centre. Hot water from the engine was circulated through the heaters by means of an electrically operated water pump. Air was drawn into the compartment through air ducts which were located on each side of the bus below one of the openable windows. Large

electrically powered fans drew the air into the compartment past the heaters. It should be noted that replaceable filters were installed in the heating system between the air intake ducts and the heaters. The filters removed any large airborne particles in the incoming air. After the air was heated, the fans forced the air through the ducts which travelled along the sides of the bus interior. A space between the exterior panelling and the interior aluminum wainscoating permitted the hot air to escape along the top of the wainscoating, just below the windows. This arrangement evenly distributed the heated air throughout the interior as well as preventing the windows from fogging. Small intake ducts located beneath two of the cross seats enabled the air within the bus to be drawn into the heater compartment. The thermostat assembly was also located in one of those ducts. The heating system was supplemented, at the front of the bus, by an independent heater which was designed as a defroster for the windshield. Dampers at the operator's position enabled the operator to control the temperature in the front of the bus independently of the temperature in the remainder of the bus. (GMC Maintenance Manual, 1962, pp. 64-75) This type of heating system enabled storm sashes to be dispensed with. (Edmonton Journal, January 25, 1960, p. 22, and Author's Photographs) It should be noted that the interior surfaces of both the wainscoating and the exterior sheathing were coated with a thin layer of asphalt compound which was designed to deaden any vibrations and noises in the panels. (GMC Maintenance Manual, pp. 64-75)

The interior lighting was also improved. Instead of individual incandescent fixtures, these buses contained several fluorescent lamps which were placed in a line along the centre of the ceiling. The fluorescent lamps produced a more intense light without a large increase in required

current. It should be noted that the fluorescent lighting system employed several transistors in conjunction with inductors in order to provide the appropriate voltage for the lamps. (GMC Maintenance Manual, pp. 257-264) This was the first application of solid state semiconductors on any ETS bus.

In addition to possessing corner clearance lamps, these buses were equipped with two sets of three clearance lamps each and they were located at the front and the rear of the bus above the windows in the centre. A right-hand rear view mirror was also included with these buses. This mirror permitted the operator to observe pedestrians and vehicles along the right-hand side of the bus. This type of mirror was subsequently installed on all other ETS buses. It should be recalled that the ERR streetcars had right-hand mirrors installed in 1912 to enable the motormen to observe the area to the right of the streetcar in order to prevent mishaps. In less than ten years after the abandonment of its streetcar service, the ETS began to re-introduce the use of the right-hand rear view mirror on its rolling stock.

A dual system of headlights was employed with the new GMC buses (two headlights each for the low and high beams). (GMC Maintenance Manual, 1962, pp. 249-256) The dual headlight system was designed to reduce the cost of lamp replacement since each sealed beam unit contained only one filament.

Except for the areas covered by the fluted aluminum panels, the buses were painted in the standard ETS colors. The black stripe between the red and ivory areas was omitted, however. Because of the large aluminum panels along each side, these buses were frequently referred to as "silverside" buses by ETS personnel. (ETS Listing of Rolling Stock, 1966) The five buses ordered in 1960 were numbered 434 through 438

and were driven to Edmonton from GMC's Pontiac, Michigan factory. (ETS Listing of Buses, 1962)

The appearance of the GMC transit bus body has remained unaltered basically since 1960. Buses Numbers 434 through 438, therefore, resembled the trolley bus which is shown in Plate 47. It should be noted that the paint scheme on the trolley bus was introduced during the late 1970's and was not initially applied to buses Numbers 434 through 438. The air intake duct below the second large window should be noted.

Equipment Modifications, 1960-1965

One item which required frequent and expensive maintenance on some of the older buses in the ETS were the leaf spring assemblies on the front and the rear axles. After prolonged periods of repeated flexing and relaxing, many of the leaf springs broke and they required repairs or replacement pieces. Such repairs or replacements were expensive and the bus remained unserviceable until the repairs were completed. In order to overcome these problems, the ETS experimented with an air suspension system on some of its motor and trolley buses. (Letter to Twin Coach Company of Canada Ltd. from ETS Superintendent D. L. MacDonald, March 9, 1960)

Special air suspension conversion kits were designed and manufactured by the Twin Coach Company of Canada which had ceased bus production but was continuing to make certain bus components. The conversion kits were applied to those vehicles which did not have an air suspension system and which were thought to have several more years of service left. Most of the 44-S and 45-S model Twin Coach buses, therefore, were fitted with the air suspension kits. In order to install the kits, most of the spring leaves were removed from the bus, the weight of

the bus being borne by the air bellows. A few spring leaves were left in place to support the bottoms of the bellows and to hold the axles in position since these buses were not equipped with radius rods. By the end of 1965, the ETS had converted most of its older buses remaining in service to air suspension. In addition to reducing maintenance and repair costs, the new air suspension provided a smoother ride on the older vehicles. (Letter to the City Commissioners from ETS Superintendent D. L. MacDonald, December 3, 1964)

New Equipment, 1961-1962

In 1961, the ETS in conjunction with the Edmonton Public School Board began to provide school bus service in several large school districts within Edmonton. In order to provide this service, the ETS purchased five school buses. The first three units, numbered 801 through 803, were manufactured by the Oneida Company and were imported from the United States. These buses were similar in design to buses Numbers 1 through 4 except that the school buses possessed steel and aluminum bodies and were painted a bright yellow for safety purposes. Apart from the numbers, the only external lettering applied to the sides of the buses was the phrase "Edmonton School Bus" in black letters. (Letter to Commissioner D. B. Menzies from ETS Special Service Engineer J. A. Ross, May 24, 1963, p. 2, and Author's Photographs) The remaining two units consisted of International Harvester Company truck chassis and engines. Bodies fabricated by the Carpenter Body Works of Milton, Ontario were attached to the chassis. These buses were numbered 804 and 805 and were painted in the same fashion as buses Numbers 801 through 803. (ETS Listing of Rolling Stock, 1966, and Author's Photographs) Both makes of school bus were powered by gasoline engines and were not used for regular

transit service. The ETS assigned these buses such high numbers so that the school buses could easily be distinguishable from regular transit buses.

An additional 15 school buses were ordered during 1962 from three companies: Carpenter, Superior Manufacturing and Bluebird Bus Company. (ETS Listing of Rolling Stock, 1966; see also Appendix I) These buses differed from the first group of school buses. They possessed full-length bodies which were similar in design to the bodies on Leyland buses Numbers 5 and 6. The new school buses could seat 72 pupils. In addition, these buses were equipped with a front roller sign which was mounted above the windshield. It should be noted that all the ETS school buses to this point possessed only one door on the right-hand side. The door was located near the front of the body and was controlled by a lever arrangement located to the right of the operator. (Author's Photographs) These buses were numbered 830 through 844. (See Appendix I) The higher numbers were used to distinguish these units, with full-length bodies, from the earlier school buses which possessed shorter bodies and protruding engines.

The ETS also ordered ten additional GMC TDH-5301 buses in June 1962 which were identical in appearance to buses Numbers 434 through 438. The new buses were assembled at the GMC plant in London, Ontario, hence the addition of the prefix "C" on the serial numbers. (See Appendix I; Letter to the City Commissioners from ETS Superintendent D. L. MacDonald, July 20, 1962) These buses were sent to Edmonton by rail since a reasonable freight rate was obtained. They were numbered 439 through 448. (See Appendix I)

In July 1962, General Motors informed the ETS that if they required any TDH-5301 buses in 1963, orders for them should be placed at an early date to avoid production delays. The ETS, therefore, recommended

that 25 of the buses be ordered for 1963 delivery. This number was based upon ridership estimates for 1963. (Letter to the City Commissioners from ETS Superintendent D. L. MacDonald, July 20, 1962)

Buses Numbers 439 through 443, which had been ordered in June 1962, arrived during October while buses Numbers 444 through 448 arrived during January and February 1963. It should be noted that bus Number 445 never operated in Edmonton. Upon arrival in Edmonton, it was discovered that the bus had been severely damaged while in transit. A large section of the right-hand side was pushed in. This had resulted in the destruction of most of the windows and seats along that side as well as several structural members. It was the opinion of both the ETS Director of Equipment and the GMC representative that the bus was irreparable. The ETS refused to accept the unit. (Letter to ETS Superintendent D. L. MacDonald from ETS Director of Equipment S. R. Daviss, February 4, 1963) The CNR, who had transported the bus to Edmonton, reimbursed the City for the cost of the unit. The CNR, in turn, sold the bus to the Calgary Transit System where it was later repaired and placed in service as their Number 551. (Letter to ETS Superintendent D. L. MacDonald from W. T. Arnett, March 25, 1963, and ETS Listing of Rolling Stock, 1966)

Used Equipment, 1962

Increases in ridership, especially during peak hours, had left the ETS short of buses. In an attempt to overcome this shortage, the ETS purchased 20 used Twin Coach buses from the Winnipeg (Manitoba) Transit System during October. Ten of the buses were model 41-S which could seat 41 passengers, while the remaining ten buses were model 38-S which could seat 38 passengers. (Memorandum to the City Commissioners from

ETS Superintendent D. L. MacDonald, October 31, 1962) Both bus models were powered by gasoline-fueled FTC 180 engines. The buses were driven to Edmonton and were placed in service immediately. (Memorandum to ETS Superintendent D. L. MacDonald from Commissioner D. B. Menzies, October 24, 1962, and Edmonton Journal, November 3, 1962) As time permitted, the buses were repainted to the ETS colors and were given ETS numbers. The ten 41-S buses were numbered 501 through 510, while the ten 38-S buses were numbered 511 through 520. (ETS Listing of Rolling Stock, 1966; see also Appendix I)

Instead of the previously used decal crests and lettering, the ETS applied metal numbers as well as cast aluminum crests on these buses. The numbers and the crests were secured to the bus by means of screws. It had been discovered that the decals were not permanent because they frequently were worn off the buses when they passed through the rotating brushes in the wash racks in the various ETS service garages. (Edmonton Journal, November 3, 1962) The cast aluminum crests consisted of the letters "ETS" represented in a stylized script form. An example of the crest may be seen on Plate 38.

New Equipment, 1963

The 25 GMC TDH-5301 buses ordered in August 1962 arrived in Edmonton during February 1963. (ETS Listing of Rolling Stock, 1966) These buses were numbered 449 through 493. (See Appendix I) It is not known whether these buses came equipped with the new cast aluminum crests or the older decals.

The ETS ordered a further ten school buses in 1963. The order was split evenly between two companies, Carpenter and Bluebird. Other manufacturers, including Superior, were not considered since their bids

were too high. (Letter to Commissioner D. B. Menzies from ETS Special Service Engineer J. A. Ross, May 24, 1963) The Carpenter buses were similar to the buses ordered previously. These units also came equipped with automatic transmissions and storm sashes for the side windows. Four of the five Bluebird buses were also similar to the units purchased previously and were also equipped with automatic transmissions and storm sashes. The fifth Bluebird bus was modified to include a manually operated centre exit door. In addition, this unit was also equipped with standee windows as well as additional stanchions and grab handles. The ETS ordered this particular type of school bus in order to place it experimentally in regular service. (Letter to Commissioner D. B. Menzies from ETS Special Service Engineer J. A. Ross, May 24, 1963) The buses were numbered 845 through 854, with Number 854 being outfitted for regular transit service. (See Appendix I)

During 1963, the ETS ordered an additional ten GMC buses. These units were to be GMC's new TDH-5303 model which was quite similar to the older 5301 model. The 5303 model, besides being slightly longer, possessed a different tail light configuration which dispensed with the use of a fibreglass housing. In addition, these buses contained fluorescent lamp illuminated advertising card holders which were placed along either side of the interior above the standee windows. These fixtures were used in lieu of centrally mounted ceiling fluorescent fixtures. (ETS Specifications of Rolling Stock, 1967, and Author's Photographs) The ten buses did not arrive until 1964. (ETS Listing of Rolling Stock, 1966, and Appendix I)

Equipment Disposal, 1960-1970

The gradual withdrawal of the C-36 buses continued during this

period. Many of these buses had been in service over 15 years. While some of the buses were sold as operable units to other bus operators, many of the units had developed structural cracks. In addition, the Hall-Scott engines were beginning to require major rebuilding and replacement parts were becoming difficult to obtain. (ETS Listing of Bus Disposals, 1971, and Edmonton Journal, February 3, 1963) The C-36 buses that were in reasonable condition were sold to private individuals for personal use while those units with serious structural defects were stripped of all useable parts and were scrapped. All of the C-36 buses, including the units purchased from St. John, New Brunswick, were removed from service by the end of 1969 and the last surplus unit was disposed of in 1971. (ETS Listing of Bus Disposals, 1971; see also Appendix I) It is of interest to note that the ETS stored one of the C-36 buses for historical purposes and renumbered another C-36 bus and used it for storage purposes. (ETS Listing of Vehicle Registration, 1974; see also Appendix I)

During this period, the six Mack C-37DT buses were also removed from service. Although these buses were generally in better condition than the C-36 buses, the Mack diesel buses were smaller and could not efficiently transport large numbers of passengers. All of these buses were out of service by the end of 1966. (ETS Inventory of Buses, November 1966)

Lack of passenger capacity was not the reason why all the FLP-40 Twin Coach propane buses were scrapped during this period. These buses were extended versions of the Twin Coach model 45-S bus. When the FLP-40 model was designed, the basic substructure of the model 45-S bus was enlarged. The main longitudinal support members in the FLP-40 buses, although lengthened, were not increased in thickness.

These members, consequently, could not withstand the stresses placed upon them. As a result, the support members on several of these buses began to crack and were in danger of collapsing. In view of this condition the ETS, during 1965 and 1966, removed these buses from service and removed all useable parts. The bus bodies were then scrapped. (ETS Inventory of Buses, November 1966; see also Appendix I)

Several of the model 38-S Twin Coach buses purchased from Winnipeg during 1962 were scrapped during 1966. After many years of service in both Winnipeg and Edmonton, several of these buses were in poor condition. Bus Number 510, a former Winnipeg model 41-S Twin Coach bus, was also scrapped during 1966 because it had been involved in a severe collision and was not worth repairing. The remaining 41-S buses were renumbered 1 through 9, while the remaining 38-S buses were renumbered 11 through 14. This was the second time that these numbers were used by ETS for its buses. The buses were renumbered in order to provide numeric continuity to a new order of GMC buses that had arrived during 1966. (ETS Inventory of Buses, November 1966) Buses Numbers 1 through 9 and 11 through 14 were all withdrawn from service by the end of 1968 when new buses arrived to replace them. (ETS Listing of Bus Disposals, 1971; see also Appendix I)

It was mentioned in the previous section that school buses Numbers 801 and 802 were traded in on new buses during 1963. The remaining school buses that had been purchased before 1963 were all withdrawn from service and were sold by the end of 1970. (ETS Listing of Bus Disposals, 1971; see also Appendix I)

New Equipment, 1964-1967

The ten GMC model TDH-5303 buses that had been ordered during

1963 arrived during 1964. These buses were painted in the standard ETS colors and were equipped with the new ETS aluminum crests. (Author's Photographs) The buses were numbered 474 through 493. (See Appendix I)

The previous section described how many of the older ETS buses were being withdrawn from service during the 1960's. The City was reluctant to replace these buses with expensive GMC units so the ETS was encouraged to solicit bids from foreign bus builders. It was believed by the City that offshore manufacturers could design suitable "prototype" buses to Edmonton's specifications and could supply the buses to the City at a cost approximately below that of domestic manufacturers. (Letter to Mitsui and Co. Manager F. Kakehi from ETS Superintendent D. L. MacDonald, January 24, 1964)

During 1963, Mitsubishi Heavy Industries and the Fuso Coach Works both of Japan had designed a diesel powered motorbus for the Western Canadian market based upon specifications supplied by the Winnipeg Transit System. One prototype bus, designated model MAR750L, was assembled by the end of 1963 and was shipped to Canada where it was operated in Winnipeg as a demonstrator. In March 1964, the bus arrived in Edmonton where it was purchased by the ETS which was eager to try different types of buses in regular service over long periods of time. (City of Edmonton Material Purchase Requisition A 75533, March 5, 1964, and Letter to the City Commissioners from Mitsubishi International Corporation, May 29, 1964)

The Mitsubishi-Fuso bus was quite similar in both appearance and construction to the recent GMC buses in service on the ETS. The Mitsubishi-Fuso bus, however, contained several different features. A large rear mounted four-stroke V-8 diesel engine was supplied with this

bus for additional power on steep grades. This particular type of diesel engine (four-stroke) employed a complicated system of electrically-powered glow plugs in the cylinder to assist with starting. (Mitsubishi Specifications of Model MAR750L Bus, p. 1) The heating system was also different on this bus. In addition to a coolant-heated hot air heater and defroster, this unit was supplied with an auxiliary heater which burned diesel fuel for heat. This unit, which was located beneath the right-hand side of the bus near its centre, employed a heat exchanger and a fan to introduce heated air into the bus. The operation of the auxiliary heater was controlled by a thermostat located in the interior of the bus. Fibreglass insulating material was used in the construction of this bus. (Mitsubishi Specifications of Model MAR750L Bus, p. 8)

The interior could seat 51 passengers and possessed a treadle-operated centre exit door. Interior lighting was provided by ceiling mounted fluorescent lights which were arranged in a similar manner to the lighting in the GMC TDH-5301 buses. (Mitsubishi Specifications of Model MAR750L Bus, p. 5 & p. 8) The exterior lighting included clearance and directional lamps as well as yellow fog lamps which were located directly below the headlights. (Mitsubishi Specifications of Model MAR750L Bus, p. 9)

Upon arrival in Edmonton, the bus was painted in a special version of the ETS colors and was numbered 10. While the upper portion of the bus was painted ivory, the areas below the windows consisted of three horizontal bands of different colors. The ETS red was placed immediately below the windows and as a trim around the front and rear windows. A much wider band of grey paint was applied between the red paint and the bottom of the fog lights and the tail light assemblies. The lowest portion of the bus was painted ivory. (ETS Listing of Rolling Stock, 1966, and Color Photograph in Author's Collection)

After a short period in service, the Mitsubishi-Fuso bus was found to have several deficiencies which made it unsatisfactory for use in Edmonton. One major deficiency was that the bus operators had extreme difficulty in steering the bus because of its small diameter steering wheel. The four-stroke engine was prone to frequent breakdowns which resulted in the bus being out of service for prolonged periods of time while replacement parts arrived. The most significant problem, however, was the difficulty service and repair crews had in reaching components such as the torque converter. (Memorandum to ETS Superintendent D. L. MacDonald from ETS Director of Equipment S. R. Daviss, May 1964, and Letter to Metropolitan Corporation of Greater Winnipeg from ETS Director of Equipment S. R. Daviss, June 14, 1971)

Other prototype buses were purchased by the ETS during 1964. The Nissan Motor Company of Japan, which marketed "Datsun" and "Nissan" automobiles in Canada, designed a prototype bus for the ETS according to their specifications. For evaluative purposes, the ETS ordered three of the prototype buses from Nissan in April 1964. (Letter to the City Commissioners from ETS Superintendent D. L. MacDonald, April 24, 1964) These buses, designated Model 6RLA110-K2, were similar to the GMC buses in construction. The model designation described some of the main features of the buses. The "6" referred to the number of engine cylinders, while the "R" signified that the engine was located in the rear of the bus. The "L" stood for left-hand drive, while the "A" signified that air suspension was used. The "110-K2" referred to the body configuration. (Specifications of Nissan Model 6RLA110-K2 Diesel Bus, March 1964, p. 1)

The engine was a six cylinder inline two-stroke diesel which operated in a similar fashion to the GM 6V-71 diesel engine. The Nissan UD6

engine, however, was mounted longitudinally at the rear of the bus because of its increased length. In order to accommodate the engine, the floor of the bus was raised near the rear of the interior. The torque was transmitted from the engine to the rear axle through a torque converter. The torque converter was designed so that it was operated by two levers which were located at the operator's position. One lever selected the direction of travel, while the other lever selected the gear range within the converter. (Specifications of Nissan Model 6RLA110-K2 Diesel Bus, March 1964, pp. 4-8)

The Nissan prototype, unlike the GMC buses operated by the ETS at that time, used steel for the majority of the structural members and for the sheathing. In order to keep weight to a minimum, the thickness of the panels was reduced, which increased their vulnerability to damage from blows. Aluminum foil insulation was installed between the interior and the exterior surfaces of the bus. (Specifications of Nissan Diesel Bus, p. 12) The heating and the interior lighting systems were similar to the systems found on the GMC buses of that period. The Nissan buses also contained a public address system which enabled the buses to be used for guided tours in the City. The windows on these buses were larger than the windows on the GMC buses. This feature eliminated the need for standee windows. The upper quarter of the side windows could be opened, while the remainder of the window was sealed. This design prevented passengers from sticking their appendages out of the windows.

Both the front and the side roller signs were illuminated. The front roller sign was designed in three separate rollers in order that two different termini could be displayed in addition to a route designation. External fog lamps were also applied to these buses. The lamps were

located directly beneath the headlights. (Specifications of Nissan Diesel Bus, p. 14, and Plate 38)

These buses were painted in the standard ETS colors and arrived in Edmonton without numbers or crests. Plate 38 (City of Edmonton Archives) shows the appearance of one of the prototype buses upon its arrival in December 1964. All of the prototype units arrived during December. These buses were numbered 601 through 603. (ETS Inventory of Buses, 1966, and Author's Photographs)

The ETS found itself short of buses in 1964 as the result of the annexation of the Town of Jasper Place by the City of Edmonton. The City was obliged to provide adequate transit service to the new area so the ETS attempted to obtain suitable buses as quickly as possible. (Letter to the City Commissioners from ETS Superintendent D. L. MacDonald, April 24, 1964) The successful experiment of using school bus Number 854 for transit service prompted the ETS to order 14 of the "transit" type of school bus from the Bluebird Bus Company by the end of April 1964. These buses were equipped with: standee windows, air brakes, and air operated front and centre doors. The buses were to be used in regular transit service until proper transit buses were obtained. The transit school buses would then be used solely for the transportation of school pupils. (Letter to the City Commissioners from ETS Superintendent D. L. MacDonald, April 27, 1964)

The buses were painted in standard ETS colors and were numbered 855 through 868. They arrived in Edmonton during September 1964. (ETS Inventory of Buses, 1966; see also Appendix I) Plate 39 (Author's Collection) shows bus Number 861 in the ETS livery during early 1965. The roller sign showing a route to Jasper Place should be noted.

An additional six Bluebird regular school buses were also purchased

Plate 38. (City of Edmonton Archives) A Nissan Bus at the Time of Delivery in 1964

Plate 39. (Author's Collection) Bluebird "Transit" School Bus Number 861

during 1964. (See Appendix I) These buses were numbered 869 through 874 but were not painted in the ETS colors. (Author's Photographs)

In early May 1964, the ETS negotiated with the British Daimler and Duple Companies for the production of a suitable prototype bus for the ETS. (Press Release from ETS Superintendent D. L. MacDonald, May 14, 1964) By September, the prototype had been developed and was planned for production. The ETS ordered three prototype units for evaluation. (Letter to the City Commissioners from ETS Superintendent D. L. MacDonald, September 10, 1964, and CECR No. 40, September 14, 1964)

The design of this bus was a regression to the bus building techniques common before the Second World War. The buses were to consist of a welded steel chassis fabricated by one company with a body that was manufactured by another company. It should be recalled that the original motorbuses 1 through 10 were manufactured in this fashion. Unlike the earlier motorbuses, however, these units were assembled from components gathered from five separate companies. The chassis were manufactured by Daimler Transport Vehicles of Coventry, England. These chassis were designed to support a longitudinally-mounted rear diesel engine. The engine selected for these buses was a British manufactured Cummins six cylinder diesel in "V" configuration. The torque converter selected for these buses were manufactured in Britain by the Allison Company, a GM subsidiary. (Letter to Edmonton's Director of Purchasing from Daimler Transport Vehicles, February 4, 1965)

The bodies were manufactured by Duple Motor Bodies Limited and consisted of steel framing with aluminum and fibreglass panels on the exterior. Fibreglass panels were used for the front and the rear panels only. The exterior panels were secured to the frame with aviation-type

pop rivets instead of the solid type of rivets that were commonly used by other bus manufacturers. The interiors were finished with plywood for the floors and wainscoating, and fibreglass panels for the ceiling. Fibreglass insulation was installed between the exterior and the interior of the body. (Duple Specifications of Metal Framed Transit Coach, 1965) Because the chassis incorporated low ground clearance, only single steps were required at the front and at the centre exit doors. The flooring, however, had to be sloped near the rear in order to accommodate the engine. The windows on these buses were similar to the window design of the Nissan buses. The general appearance of the Daimler-Duple buses were similar to the Nissan buses as well. Fog lamps, however, were not installed on the Daimler-Duple buses. Illuminated front and side roller signs were provided. While the front roller sign could display termini as well as route designations, the side and the rear roller signs could display route designations only. It should be noted that the side roller sign was incorporated into the roof above the side windows. The heating system on these buses was designed and installed by the Clayton-Dewandre Company who also supplied a front defroster. (Duple Specifications of Metal Framed Transit Coach)

When complete, the buses were to be painted in the standard ETS colors and shipped to Edmonton. (Duple Specifications for Metal Framed Transit Coach) The entire bus was known as model SRC6, or "Roadliner". (CECR No. 40, September 14, 1964) Production difficulties delayed the construction of the prototype buses until 1966. (Letter to ETS Superintendent D. L. MacDonald from Duple Sales Group, March 2, 1966)

By late 1964, the ETS determined that it would require 35 additional transit buses during 1965. Seven bus manufacturers submitted bids. Of the seven, only two were domestic builders. It was the opinion of

the ETS management that foreign buses should be purchased since such buses were far less expensive than domestic buses and there seemed to be very little difference in technology between foreign and domestic buses. (Report to the City Commissioners from ETS Superintendent D. L. MacDonald, December 11, 1964) At this point, the ETS owned one Mitsubishi-Fuso and three Nissan prototype buses. None of the Daimler-Duple prototype buses had yet arrived. Based on their experience with the Nissan buses, the ETS recommended the purchase of ten production units. In his report to the Commissioners, Superintendent MacDonald stated, "These buses as evidenced by their prototype appear to be very well built" (p. 4). The remaining 25 buses were ordered from Daimler-Duple. This decision was based upon low cost and the design of the bodies. (Report to the City Commissioners from ETS Superintendent D. L. MacDonald, December 11, 1964, p. 4)

Although both types of buses were equipped with diesel engines, Superintendent MacDonald noted that the buses were designed so that they could easily be converted to trolley bus operation or could be fitted with propane-fuelled engines, including small gas-turbine engines. It should be noted that propane-fuelled bus engines were no longer being manufactured. (Report to the City Commissioners from ETS Superintendent D. L. MacDonald, December 11, 1964, p. 4)

The ETS submitted an extensive list of modifications to the Nissan buses before the production run of ten buses was started. In addition to several minor modifications to the interior, the ETS asked to have the dual selector lever arrangement for the torque converter replaced by a single lever in order to avoid operator confusion. The treadle unit for the centre exit door had been found to be prone to failure during cold weather, and the ETS requested that a manually operated push door

be supplied with the production units. In addition, the ETS had found that the fuel tanks were too small on the prototype buses so the ETS requested that the tank size be increased from 44 imperial gallons (200 L) to between 85 and 90 gallons (386 to 409 L). (ETS Listing of Modifications for Future Nissan Buses, 1964, and Nissan model 6RLA110-K2 Owner's Manual, 1965)

None of the Nissan or Daimler-Duple buses arrived during 1965. In January 1966, the ETS determined that it required 17 new buses as soon as possible in order to be able to provide service on new routes. (CECR No. 66, January 24, 1966) The ETS recommended that the buses be purchased from GMC for two main reasons. Firstly, buses of a large capacity were required, which eliminated most of the foreign builders. Secondly, the buses had to be ready for service immediately upon arrival and could not spend time in the shops undergoing modifications. (Letter to the City Commissioners from ETS Superintendent D. L. MacDonald, January 27, 1966) The City Council approved the recommended bus purchase in February. (Letter to the City Commissioners from ETS Superintendent D. L. MacDonald, February 10, 1966)

The buses were model TDH-5303 and were similar to the last order of GMC buses. The new buses were numbered 494 through 510 and arrived in Edmonton during June 1966. (ETS Specifications of buses, September 1972)

The new Nissan buses arrived during February and March 1966. The buses were numbered 604 through 613 and were identical in external appearance to the prototypes 601 through 603. The production units, however, incorporated the various modifications requested by the ETS. (Nissan Model 6RLA110-K2 Owner's Manual, 1965)

The Daimler-Duple buses began to arrive after March 1966. The

buses were numbered 701 through 728, with 701 through 703 being the prototype units. Bus Number 701 was the first unit to arrive. (ETS Listing of Daimler Buses, January 1968; see also Appendix I) Production difficulties delayed the arrival of the other buses. They arrived sporadically between September 1966 and October 1968. (ETS Listing of Daimler Buses, 1968; see also Appendix I)

Serious problems began to manifest themselves in these buses before the end of 1966. The Allison transmissions had tended to fail in such ways that they became seriously damaged, resulting in long repair periods for the buses. (Letter to Daimler Transport Vehicles from ETS Assistant Director of Equipment L. F. Wiebe, August 30, 1967) Other problems developed with these buses. They included: the overheating of the engines, uneven brake application, difficulty in engine starting, small fuel tank capacity, excessive vibration of the body, excessive noise in the interior caused by vibrations and the heating system, and solid particles entering the air intakes. (Letters to Daimler Transport Vehicles, from ETS Assistant Director of Equipment L. F. Wiebe, January 26, and February 14, 1968) Extensive modifications were required if these buses were to be serviceable units.

New Equipment, 1967-1969

The ETS required an additional 25 buses for 1967 and recommended that the units be purchased from GMC. Foreign built units were not considered because the foreign buses in service on the ETS did not perform as well as the GMC buses. Superintendent MacDonald stated,

> The City of Edmonton has given a great deal of encouragement to foreign bus builders and ordered a number of such vehicles . . . . This experience has proven that a very great deal of development must be accomplished to provide suitable equipment to meet the stringent requirements of bus operation here. (Letter to the

City Commissioners from ETS Superintendent D. L. MacDonald, November 24, 1966)

The Commissioners and the Council both approved of the ETS recommendations and the 25 buses were ordered from GMC. (CECR No. 4, November 28, 1966) The buses were model TDH-5303 and were similar to the previous group of GMC unit obtained by the ETS. The buses were numbered 511 through 535 and arrived in Edmonton during 1967. (ETS Specifications of Buses, September 1972; see also Appendix I)

By 1968, most of the smaller gasoline and diesel buses had been withdrawn from service. Many of those buses had operated over the lower deck of the narrow High Level Bridge. The ETS believed that the longer buses in its fleet could not easily traverse the bridge so the ETS requested the purchase of a number of shorter GMC buses for those routes over the High Level Bridge. (Letter to the City Commissioners from ETS Superintendent D. L. MacDonald, February 20, 1968) The City Council approved the purchase of ten such buses. (CECR No. 7, February 26, 1968)

These buses were identical in appearance to the larger GMC buses in the ETS fleet. The new buses, however, were shorter in length and were equipped with white reverse lights at the rear, and catalytic mufflers. A catalytic muffler was a device which was attached to the exhaust pipe and, in addition to reducing the exhaust noise, directed the exhaust through a number of ceramic beads which were coated with a catalyst; the catalyst accelerated chemical reactions which oxidized and neutralized many of the odors and toxic substances in the exhaust. In addition, these buses contained a public address system to enable them to be used for guided tours. (Letter to the City Commissioners from

ETS Superintendent D. L. MacDonald, February 20, 1968)

A new model designation was used by GMC for these buses. The middle letter in the three letter prefix was replaced by a numeral which indicated the number of cylinders of the engine supplied. The new buses, therefore, were referred to as model T6H-4521. (ETS Specifications of Buses, 1972) The buses were numbered 1 through 10 (the third use of these numbers) and were delivered to Edmonton during 1968. (See Appendix I)

The City Commissioners also instructed the ETS that no buses were to be purchased for the system unless that type of bus had been successfully operated in: Calgary, Winnipeg, Regina and Saskatoon. (CECR No. 7, February 26, 1968) This instruction effectively prevented the purchase of any further foreign built buses by the ETS.

An additional 15 GMC T6H-4521 buses were purchased during 1969. (Memorandum to ETS Superintendent D. L. MacDonald from Commissioner S. J. Hampton, June 11, 1969) The buses were numbered 11 through 25 and were identical to the last order of that model. (ETS Specifications of Buses, 1972; see also Appendix I)

The ETS had also received a bid for 51 passenger capacity buses manufactured by the Western Flyer Company of Winnipeg, Manitoba. The City was reluctant to purchase any Flyer buses because of the ETS's disastrous experience with the Daimler-Duple buses. Superintendent MacDonald, however, felt that the City should observe this make of bus, since it was a domestic product, and such buses were in use in Winnipeg. (Memorandum to Commissioner S. J. Hampton from ETS Superintendent D. L. MacDonald, June 10, 1969)

Equipment Modifications, 1968-1970

The problems with the Daimler-Duple buses (described in a previous section) were gradually dealt with by the companies concerned. Recurring engine and transmission problems were never resolved on these buses. Long delays in the repairs were encountered because the different companies could not agree on who was responsible for each modification and repair required. As a result of these long delays and recurring problems, no more than half of the Daimler-Duple buses were available for service at any given time. This situation placed ETS operations in a precarious position because of the unreliability of these buses. The disastrous performance of the Daimler-Duple buses gave the City a very poor impression of foreign buses, and of British buses in particular. (Minutes of Special Meeting, March 26, 1968) Although the Daimler-Duple buses had been less expensive than other buses in the ETS fleet, their poor reliability combined with poor after-sale service by the various manufacturers convinced the City that such buses should not be ordered in future. (Letter to the City Commissioners from ETS Superintendent D. L. MacDonald, February 20, 1968)

The Mitsubishi-Fuso bus was renumbered 600 from 10 in 1968 because of the arrival of the short GMC buses which were numbered 1 through 10. (See Appendix I)

New Equipment, 1971

The ETS obtained the use of a Western Flyer Company model D700A demonstrator diesel bus on a one year lease. (Memorandum to ETS Superintendent D. L. MacDonald from ETS Director of Equipment S. R. Daviss, April 14, 1972) The D700A was very similar in appearance to the GMC buses in use on the ETS. The bus was equipped with a 6V-71 engine

manufactured by Detroit Diesel, a subsidiary of GM. The engine was mounted longitudinally at the rear of the bus. A Spicer torque converter was also supplied with the bus. The longitudinal mounting of the engine meant that many of the auxiliary devices, such as the alternator, had to be driven by belts instead of by gears, as was the normal arrangement for engines in the GMC buses. The use of belts was not satisfactory since they were difficult to reach and they frequently wore out. The heating system on the bus, as well as its interior appointments, were similar to the GMC TDH-5303 buses in the ETS. (Western Flyer Company Specifications of Series D700A Bus, 1970) The unit was originally painted in the colors of the Winnipeg Transit System but the unit was numbered "700" by the ETS. (Author's Photograph)

Equipment Modifications, 1971

Problems with foreign-built buses were not limited to the Daimler-Duple buses. The Nissan buses had been encountering recurring problems with their diesel engines. The ETS hoped to reduce repairs on these buses by replacing the existing engines with engines of a different make. In early 1971, the UD6 engine in bus Number 601 was replaced with a GM 6V-71 engine as an experiment. Although the engine functioned properly, it precipitated problems with the transmission and with auxiliary systems. The experiment was not considered a success and the ETS abandoned further plans to replace the UD6 engines in the Nissan buses. (Canadian Coach, February 1971, p. 5)

Equipment Disposal, 1970-1977

The ETS disposed of most of their prototype and foreign buses during this period. The Mitsubishi-Fuso bus, Number 600, had seen little regular

service. Some individuals expressed an interest in the bus so the ETS leased the unit for a trial period. On its initial run from Edmonton in June 1971, a serious coolant leak developed in the engine. This leak led to the engine seizing. The ETS decided that it would not be economical to repair the unit so it was sold as a non-operational unit suitable for parts. (Letter to R. W. Church from ETS Director of Equipment S. R. Daviss, June 14, 1971)

The entire fleet of Nissan and Daimler-Duple buses were retired between 1973 and the end of 1974. Prior to this time, these buses had been used for charters and for standby service only because of their poor reliability. (Edmonton Journal, January 6, 1973, p. 3) All of the buses were either sold or were scrapped, with the exception of bus Number 707 which was used by the ETS as a travelling information bus (Infobus). (ETS Listing of Equipment Disposals, 1977, and Author's Photographs; see also Appendix I)

The remaining gasoline and propane powered Twin Coach buses were also retired from service during this period. The operation of these buses was terminated by the end of 1975. (ETS Interdepartmenal Memorandum from S. R. Daviss to B. Aseltine, December 22, 1975) Bus Number 59 was preserved, while the remainder were either sold or scrapped. (See Appendix I) It is important to note that many of the propane powered Twin Coach buses had been in service almost 25 years, while the Nissan and the Daimler-Duple buses had been retired after less than ten years of service. It is evident that the older Twin Coach buses were superior in construction and design to the foreign-built buses.

The regular school and the transit school buses were also retired and sold during this period. The age of these buses, combined with increased maintenance costs and the arrival of the new units, were the

factors which led the ETS to retire the older school buses. (ETS Notices of Surplus Bus Sales, 1974-1977; see also Appendix I)

New Equipment, 1972-1974

The ETS purchased the leased Western Flyer bus for long term evaluation. The bus was painted in ETS colors at this time. The ETS did not consider the bus equivalent to the GMC buses in either construction or performance. (Memorandum to the City Commissioners from ETS Superintendent D. L. MacDonald, April 14, 1972)

A total of 34 new GMC buses were required by the ETS during 1972, and were ordered. (Memorandum to the City Commissioners from ETS Superintendent D. L. MacDonald, April 14, 1972) The buses were GMC's new model T6H-5307N. The basic design of the 5307N was similar to the older 5303 model. It should be noted that the "N" suffix signified that the model did not contain air conditioning apparatus. The 5307N model also contained several new features not found on the older 5303 model. The older 6V-71 engine was replaced by a more powerful version which was known as the 6V-71N. This engine, in addition to having a maximum output of 219 H.P. (163 kW), contained a catalytic muffler, a special external air intake, and a vertical exhaust. (ETS Specifications of Buses, 1972, and Author's Photographs) The extreme left-hand and right-hand portions of the rear windows were replaced by the intake housing and the exhaust assembly. The air intake, located on the right-hand side, consisted of a chemically blackened sheet steel duct which was angled towards the right-hand side of the bus. The exhaust was located on the left-hand side and consisted of an exhaust pipe which travelled vertically behind a protective blackened sheet steel cover. As the pipe neared the roof of the bus, it was curved so that it bent

away from the bus, towards the rear. (Author's Photographs) In this manner, the exhaust fumes were distributed above street level and away from the bus. It should be recalled that the SRD had experimented with vertical exhausts during the Second World War with disastrous results. The expulsion of large particles of soot, which was a problem with the original vertical exhausts, was not a problem with GMC's vertical exhaust system because of the action of the catalytic muffler.

Two adjacent treadle-operated centre exit doors were provided with each bus. The double doors were designed to facilitate rapid passenger unloading. Each door assembly consisted of two folding halves which were fabricated from sheet steel. These doors were similar in appearance and operation to the doors of the C-36 buses. (See Plate 37) The treadle apparatus consisted of hollow rubber mats placed on each step tread. The rubber mats contained electrical contacts which were normally open, and were closed by the action of a person stepping on the mat. After the person had stepped off the mat, the resilience of the rubber was supposed to open the contacts, thus allowing the door to close. (Author's Observations) It should be noted that these buses were not equipped with an emergency door. Instead, special levers were installed on each window which enabled the bottom of the window to be easily swung out during an emergency, allowing the passengers to escape. Signs placed adjacent to the levers instructed the passengers on their use. (Author's Observations)

The interior seating arrangement of these buses could each accommodate 49 passengers. In addition, an illuminated sign was attached to the ceiling of each bus near the front. When a passenger pulled the signal cord, the signal bell would ring once and small bulbs inside the sign would be energized. The sign read "next stop" in red lettering.

Once the sign was illuminated, the signal bell became inoperative. A red indicator light on the operator's dash was also illuminated when the signal cord was pulled. Upon reaching a stop, if either the front or the centre doors were opened, the illuminated sign and the operator's indicator light would both be extinguished and the signal bell would be made operational again. (Author's Observations) This visual aid assisted both the passengers and the operator in knowing whether a stop was requested. The new buses, numbered 536 through 569, arrived in Edmonton during October and November 1972. (See Appendix I)

By mid 1973, the ETS estimated that it would require an additional 41 motorbuses in 1974. The order for the buses was unevenly split between GMC and Flyer Industries Limited (formerly Western Flyer Company). (Canadian Coach, July-August 1973, p. 14) Thirty-one buses were ordered from GMC. Ten of the buses were to be model T6H-4523N, while the remaining 21 were to be model T6H-5307N. The T6H-4523N model was the short version of the 5307N model which was described in a previous paragraph. The ten T6H-4523N buses were numbered 26 through 35. These numbers ensured that all of the shorter buses were kept in numerical sequence. The 21 T6H-5307N buses were identical to the previous order of buses received by the ETS. These units were numbered 570 through 590. All of the GMC buses in this order arrived in Edmonton during November and December 1973. (ETS Listing of Buses, 1979)

The ten buses ordered from Flyer Industries were their new 800 series, model D10240. The 800 series was available in either motorbus or trolley bus configuration. The model designation revealed important features of the bus. The initial letter, in this case a "D", indicated that the bus was powered by a diesel engine. The following numbers

were the width of the bus in inches, and the length of the bus in feet; 102 inches (2 591 mm) wide and 40 feet (12 192 mm) long. (Flyer Industries Specifications of 800 Series Buses, 1974)

The construction of the Flyer buses was similar to the construction of the GMC buses. Flyer Industries, however, had improved the ruggedness of the body construction of the 800 series over the previous 700 series. The appearance of the buses had also been altered so that they did not resemble the GMC buses as much. The framework of the 800 series was made stronger than the framework of the 700 series by the inclusion of two "U" shaped steel longitudinal members. The external sheathing consisted of aluminum, fibreglass and stainless steel panels which were secured to the framing with aviation rivets. Large rectangular windows which were hinged along the tops were supplied with these buses. The large format of the windows eliminated the need for separate standee windows. One peculiar feature of the early 800 series Flyer buses was the inclusion of a triangular-shaped metal housing which was placed on the roof of the bus at the rear. This housing was designed to enclose optional air conditioning apparatus. (Flyer Industries Specifications, 1974) Like the GMC buses, the Flyer 800 series buses did not contain emergency doors but they were equipped with window escape levers and signs. In addition, the Flyer buses were also provided with treadle-operated double exit doors. (Author's Photographs) The prime mover, transmission and the heating system in the 800 series diesel bus were identical to those found on the older 700 series diesel buses. A vertical exhaust, which was entirely enclosed by the left rear corner of the body, was provided with the 800 series. It should be noted that polyurethane foam as well as fibreglass was used to insulate the 800 series buses. (Flyer Industries Specifications, 1974 and Author's Photographs)

The Flyer buses were painted in the standard ETS colors and were sent to Edmonton during July 1974. It should be noted that the side panels on these buses were not painted, as was the fashion with the GMC buses. The new Flyer buses were numbered 731 through 740. (Author's Photographs; see also Appendix I)

By the end of 1973, the ETS had determined that an additional 31 large motorbuses would be required by the end of 1974. (Canadian Coach, May-June 1974, p. 16) The buses were ordered from GMC and were identical to the previous group of T6H-5307N buses received by the ETS. The buses were painted and numbered before being sent to Edmonton during November and December 1974. It is important to note that 11 of the buses were incorrectly numbered by GMC. The buses were originally numbered 591 through 621. (GMC Photograph of Bus Number 621, in Transit Canada, July-August, 1975, p. 4) Although the numbering on buses 591 through 600 was correct, the numbers on the remainder of the order conflicted with some of the Nissan buses which had not yet been retired. (See Appendix I) In order to avoid confusion, the ETS renumbered the new GMC buses from 601 through 621, to 301 through 321. (ETS Listing of Buses, 1979)

New Equipment, 1975-1979

The rapid growth of Edmonton during this period prompted the ETS to expand its services. In late 1974, therefore, the ETS received approval from City Council to order 75 T6H-5307N buses from GMC for service expansion. (Canadian Coach, November-December, 1974, p. 18) The buses were to be similar to the last T6H-5307N units received by the ETS except for two changes. Considerable difficulty had been experienced with the folding centre exit doors so the ETS specified that single leaf

doors, similar in appearance to the manual push doors, should be supplied. The treadle mechanism would be retained, however. In addition, the centre exit steps were redesigned so that the bottom tread was two inches (51 mm) closer to the ground. This feature made it easier for some passengers to alight from the bus. (Transit Canada, July-August 1975, p. 4)

The second change on these buses was that the standee windows were omitted. The lighting system of the GMC buses, described in a previous section, provided illuminated advertising card racks which were located between the standee windows and the ceiling. In addition to being small, the card racks were thought to be too high for most passengers to want to read them. The need for standee windows was also questioned, as it was believed that most passengers did not use them. In order to increase advertising revenues, therefore, the ETS specified that the new buses were to be equipped with larger illuminated card racks instead of standee windows. (Author's Photographs)

The buses were numbered 322 through 371 and were delivered in two groups. Buses 322 through 371 had seating for 49 passengers, while the seating arrangement on buses 372 through 396 could accommodate 47 passengers each. This latter seating arrangement was designed to provide passengers with increased leg room in the cross seats. (ETAR, 1979, p. 30, and Author's Photographs) Buses 322 through 371 arrived during July and August 1975, while buses 372 through 396 arrived during December 1975. (ETS Bus Licensing Data, December 1975)

Ten new regular full-length cab Bluebird school buses were ordered during 1974. These units, which were similar to the school buses purchased during the mid 1960's, were designed to replace the older school buses that were being retired. The new school buses were not painted

in ETS colors and were numbered 801 through 810. The units were delivered during 1975. (ETAR, 1979, p. 13 & p. 30)

During 1975, the ETS ordered an additional 60 GMC T6H-5307N buses for 1976 delivery. Several mechanical modifications were to be included with these units. The ETS had found that the air filters on the buses equipped with the large external air intake were becoming extremely dirty within a short time, compared to buses with additional interior air intakes. The new buses ordered from GMC were to be equipped with additional interior air intakes as well as the external air intake. An additional change was made to the compressed air system. In the past, alcohol evaporators had been used to prevent components from freezing during winter. The evaporators, however, did little to control the amount of compressor oil and water condensate which accumulated in the system. Accumulations of condensate had to be drained from the air reservoirs at frequent intervals. In extremely cold weather, the condensate could freeze, which damaged the air system. To overcome this problem, the ETS requested the installation of a Bendix-Westinghouse Company air dryer system on each new bus. (Transit Canada, July-August 1975, pp. 19-20) The air dryer consisted of a large steel cylinder which was divided into two sections internally and which was mounted vertically. The upper half of the dryer unit consisted of an empty chamber and an outlet coupling, while the lower half contained a desiccant material, several oil removal filters, a water collection sump at the bottom with a purge valve, and an inlet coupling. Air from the compressor would pass through the desiccant and the oil removal filters where most of the suspended moisture and oil particles would be removed. The air would then pass into the chamber where it would enter the rest of the air system as dry oil-free air. The water would pass from the desiccant

into the sump which contained an electric heating element and a thermostat to prevent the accumulated water in the sump from freezing. A strong spring attached to the purge valve kept it closed normally. When the air reservoir pressure reached the value set on the pressure governor, the purge valve was opened since the spring tension on the valve was set to the same value as the governor. When the purge valve opened, the water in the sump was forcible expelled from the dryer unit by air pressure. After a brief interval, the air pressure in the dryer dropped sufficiently to enable the spring on the purge valve to close the valve. In this manner, most of the moisture and oil was removed from the air supply. (Transit Canada, July-August 1975, pp. 19-20)

A new automatic transmission (torque converter) was supplied with these buses. The new transmission, designated V730, provided three forward speed ranges which enabled a bus equipped with the transmission to travel at highway speeds without excessive engine speed. (Transit Canada, July-August 1975, p. 19)

The new GMC buses were numbered 397 through 399 and 601 through 657. All of the units contained seating for 47 passengers. The buses were delivered during April and May 1976. These buses were painted in the new colors which had been designed for Edmonton Transit (ET).

In early 1976, the name "Edmonton Transit System" was abandoned in favor of the shorter designation "Edmonton Transit". A new color scheme was adopted with the new name. (ETAR, 1976, and Author's Photographs) The portions of the bus above the fluted aluminum panels were painted white in addition to the areas below the panels. The border areas around the windshield were painted black in order to reduce reflected glare. The lower portions of the bus also contained an arrangement of yellow and blue stripes. The blue stripes contained reflective beads

for increased night visibility of the bus. The bus number in black was applied directly above the front door and above the operator's window. The number was also centred directly above the rear window. On some buses, the number was also placed at the front of the bus on the manual ventilator cover which was located below the windshield near the left-hand side of the bus. The old ETS crest was replaced by a stylized "E" decal in blue, which was followed by the word "Transit" in black lettering. The new insignia and the lettering were placed on the aluminum panels on both sides of the bus, near the front, while the insignia only was placed on the back of the bus below the rear window. It should be noted that the insignia was reversed on the left-hand side of the bus for esthetic considerations. (Author's Photographs) The blue areas were similar to Pantone ink shade 801+C, while the yellow stripes were similar to Pantone ink shade 824C. (Author's Comparisons using Pantone Matching System Book, 1980)

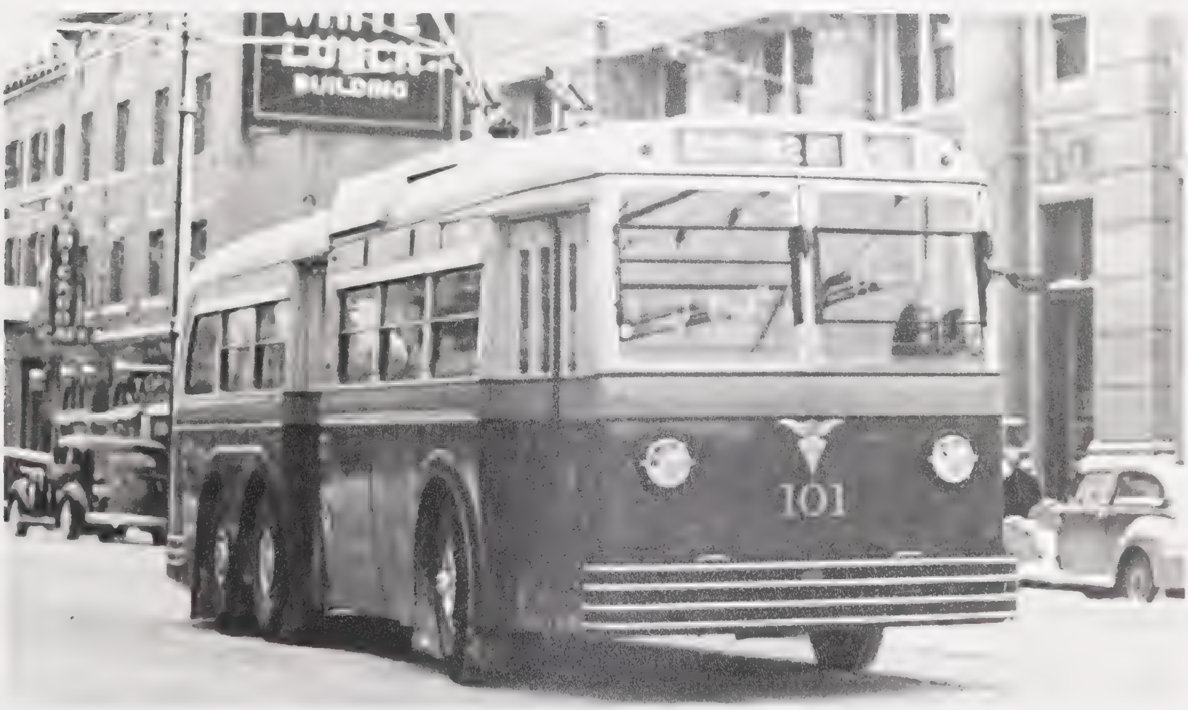
An additional 40 GMC T6H-5307N buses were ordered during 1976 and arrived in Edmonton before the end of that year. The buses, which were identical to the previous buses received, were numbered 658 through 697. (ETAR, 1979, p. 30; see also Appendix I)

During 1976 and 1977, ET ordered an additional 70 GMC T6H-5307N buses, as well as 18 Flyer Industries model D10240 buses. The GMC buses were identical to the previous order and were numbered 698 through 767. (See Appendix I) Plate 40 (Author's Photograph) depicts bus Number 704 during 1978. The new ET paint scheme as well as the lack of standee windows should be noted.

The 18 Flyer Industries buses were similar to the last order of Flyer buses purchased by the ETS. There were some minor body changes as well as some major mechanical changes with these buses. Very few

Plate 40. (Author's Photograph) Bus Number 704 (2nd)
Trolley Bus Number 247

Plate 41. (Provincial Archives of Alberta) Trolley Bus Number 101
in 1939



air conditioning units had been sold and many bus operators complained that the triangular housing on the roof of the buses had interfered with bus cleaning operations. Responding to consumer dissatisfaction, Flyer Industries omitted the housing on the new buses and installed curved transition pieces to join the roof with the back of the bus. The double centre exit doors were also modified so that they resembled the exit doors supplied with the GMC buses. (Author's Photographs)

The new Detroit Diesel 6V-71N engines were supplied with these buses as well as the V730 transmission. In addition, the engine was mounted transversely on these buses which eliminated the need to use belts to connect auxiliary apparatus to the engine. In this configuration, the Flyer Industries buses were quite similar, mechanically, to the GMC T6H-5307N buses in the ET fleet. This similarity standardized maintenance procedures among these two makes. (Transit Canada, November-December 1977, p. 12) The new Flyer buses were numbered 841 through 858 and were painted in the new ET colors. (Author's Photographs) It should be noted that the side panels on these buses were also painted white. These units, therefore, did not possess any large unpainted surfaces on the exterior sheathing. (Author's Photographs) Buses 841 through 858 were similar in appearance to the trolley bus which is depicted in Plate 45.

By the end of 1978, ET had ordered an additional 58 GMC T6H-5307N buses which were identical to the previous GMC units received. The buses were numbered 768 through 799 and 900 through 925. (ETAR, 1979, p. 30; see also Appendix I)

Between 1976 and 1979, the City of St. Albert, Alberta which is located to the northwest of Edmonton, began to operate a motorbus service between Edmonton and selected point in St. Albert. The buses,

all GMC model T6H-5307N, were maintained, stored and operated by ET personnel. Although the buses were painted in special St. Albert livery, the buses were assigned ET fleet numbers. (See Appendix I) It should be noted that these buses were equipped with standee windows, the new V730 transmission, and special tires that could withstand prolonged high-speed travel. (Author's Photographs and Observations) It should also be noted that the buses purchased by St. Albert in 1979 were manufactured by GMC's new Quebec assembly plant which was located near Montreal, hence the letter "M" as the serial number prefix. (See Appendix I)

During 1977, the County of Strathcona, located to the east of Edmonton, began to provide motorbus service between Edmonton and the Town of Sherwood Park with ten model T6H-5307N GMC buses. (ETAR, 1979, p. 30) The buses were operated in a similar manner to the St. Albert buses and were assigned ET numbers. (See Appendix I)

Equipment Modifications, 1977-1980

As time permitted, ET repainted their older vehicles in the new colors. Vehicles that were due for retirement were not repainted. Before most buses were repainted, however, the old ETS crests were removed and were replaced by adhesive-backed paper which had a small version of the new ET insignia and the word "Transit". In addition, the new numbering was also placed on the buses, even on those units scheduled for imminent retirement. (Author's Photographs) The new numbers were larger than the numbers that they replaced. In addition, the numbers were also located in standard positions which facilitated unit identification.

Many of the older buses were fitted with the electrically-operated roller signs and the passenger stop indicator lamp. These items were

usually installed on the buses as they underwent repainting. (Author's Observations)

Between 1970 and 1980, ET reintroduced the use of two-way radios on its buses. It should be recalled that some buses had been equipped with such apparatus during the early 1950's. In conjunction with the new LRT system, ET developed a radio network to facilitate bus and train operations and security. Each bus was equipped with a radio unit and a telephone-like handset. The handset was located above the operator's window inside the bus, while the radio unit was placed behind the operator's seat. A small antenna encased in a plastic dome was installed on the roof of each bus, directly behind the front centre clearance lamps. (Author's Photographs) Buses scheduled for retirement were not equipped with this apparatus. The operators of these units carried portable transceivers instead (walkie-talkies). (Author's Observations, and ETAR, 1979, p. 15)

During this period, some of the older buses were equipped with a Bendix-Westinghouse air dryer in order to eliminate moist air problems. Edmonton Transit also experimented with the use of plastic and pressed steel seats which were similar in construction to the old streetcar-type seats that had been installed on the first SRD motorbuses. The new seats were installed on bus Number 658. (Edmonton Journal, May 30, 1977, p. B14) The new seats were more expensive than the older tubular type and, consequently, their use was soon terminated.

The treadle mats which operated the centre exit doors on many of the newer GMC buses had repeatedly frozen during winter weather. A frozen treadle mat resulted in operational delays as the result of the doors either sticking open or closed. To eliminate this problem, ET experimented with other automatic door actuating devices including electric

eyes and moveable gates. In 1979, ET decided to equip the buses with treadle mats with swing gates which would open and close the centre exit doors. (ETAR, 1979, p. 19) A swing gate consisted of a small vertical pipe which was mounted at the side of the stepwell on the bus floor. The pipe was supported by an internal steel shaft which was mounted on a pedestal screwed to the bus floor. The shaft enabled the pipe to revolve around the shaft. A curved piece of plywood, aluminum or masonite was then secured with screws to a casting attached to the top of the pipe. The pipe was connected at the bottom to a moveable electrical contact which closed the door opening circuit when the gate was pushed open by a passenger descending the steps. If the bus was stopped and the operator had set the controls, the exit door would open when the gate was pushed open. When the passengers stepped off the bus, they usually released the gate and a spring located between the shaft and the pipe pulled the gate back to its original position, thus breaking the door control circuit. A delay feature prevented the doors from closing immediately, thus allowing most passengers enough time to step clear of the doors. The gate mechanism was manufactured by the Fred A. McKay Company of Montreal and was invented at the end of the Second World War as a replacement unit for treadle mechanisms on streetcars and buses. (Specifications of Safety Control Gate, 1947) The main advantage of the gate arrangement over the treadle mat was that the gate was not affected by extremely cold weather.

During 1979, ET installed special energy absorbing bumpers on ten of their GMC buses. The bumpers were composed of molded neoprene and were designed to reduce structural damage to the bus during a collision by absorbing most of the impact. (ETAR, 1979, p. 19) This type of bumper, in addition, did not require periodic maintenance like

the water bumpers tried several years earlier.

Equipment Disposal, 1978-1981

By early 1978, several longitudinal structural members in the single Western Flyer bus Number 800 had developed cracks. Faced with the spectre of costly repairs, ET decided to sell the unit. (ET Internal Memorandum to O. Kisilevich from L. F. Wiebe, 1978, and ET Notice of Tender, October 1978)

The entire fleet of GMC TDH-5105 buses, purchased between 1955 and 1958, were also retired during 1978. Bus Number 432 was retained by ET for historical purposes, while the remainder were sold to individuals as operating units. (ET Notice of Tender, October 1978)

The operation of school buses owned by ET ceased by 1981. The remaining school buses were sold as operating units. (ET Notice of Tender, 1981, and ETAR, 1982, p. 11)

New Equipment, 1980

During July 1979, City Council approved the purchase of 70 additional GMC model T6H-5307N buses for ET. (ETAR, 1979, p. 19) Thirty of the buses were to have a seating capacity of 49, while the remaining 40 buses were to have a seating capacity of 47. Several new technical features were to be included with some of the buses. Most of the units were to be equipped with energy absorbing bumpers. Forty of the buses were to be fitted with digital destination signs instead of the traditional roller signs. The new signs were installed at the front, side and rear locations. (ETAR, 1979, p. 19) The new signs employed modern electronic circuitry to display both route numbers and destinations, in addition to other messages that could be flashed across the signs at specific intervals.

Thirty of the buses were to be equipped with cloth upholstery as an experiment to determine the feasibility of using such material as a bus seat cover. The new cloth was designed to make the bus seats more comfortable while maintaining some resistance to soiling. (ETAR, 1979, p. 19) The buses were numbered 926 through 995 and were delivered to Edmonton during 1980. (ETAR, 1982, p. 30) Buses 926 through 970 were equipped with digital signs, while buses 926 through 955 were equipped with cloth upholstery. It should be noted that these buses were assembled at the GMC plant in Quebec. (ET Listing of Buses, November 1980)

During 1980, the City of St. Albert purchased an additional three GMC T6H-5307N buses while the County of Strathcona purchased an additional six buses of the same type. (ETAR, 1982, p. 31)

At the end of 1980, ET had in its operating fleet a total of 623 diesel-powered motorbuses, 37 trolley buses, and 17 LRT vehicles. (ETAR, 1982, p. 30) The motorbus, which had once been intended as a feeder vehicle for streetcar lines and (later) trolley bus lines, was not the unquestionable mainstay of Edmonton Transit's passenger fleet. All but 28 of ET's motorbuses were various GMC models. The desire, expressed by Superintendent D. L. MacDonald in December 1964, to standardize the bus fleet to one or two makes had been realized. (Report to the City Commissioners from ETS Superintendent D. L. MacDonald, December 11, 1964, pp. 3-4)

Throughout its 48 year history in Edmonton, many changes have occurred and reoccurred with the motorbus fleet. The initial fleet of gasoline-powered vehicles gave way to diesel engines which, in turn, were replaced by gasoline and propane engines. Diesel fuel, once again, appears to be the most popular fuel for ET buses. The appearance of

the vertical exhaust during the early 1940's, its rapid demise and its reappearance as a standard feature on buses during the 1970's, illustrates how technological improvements enabled an old idea to be resurrected with success. Technological regression, however, also occurred. The disastrous Daimler-Duple buses are one such example. Whether the changing technology of the motorbus will enable it to retain its position as the mainstay of the ET fleet remains to be seen in the future.

Chapter VII

Trolley Buses

Introduction

The first serious consideration of the use of trolley buses in Edmonton occurred during 1930 when SRD Superintendent W. J. Cunningham met with heavy equipment supplier H. J. Griswold. Griswold informed Superintendent Cunningham that the trolley bus was replacing streetcars in many urban centres in England because of its versatility and its use of existing street railway electrical apparatus. (Letter to SRD Superintendent W. J. Cunningham from Griswold & Co., June 18, 1930) Trolley buses of that era usually consisted of some sort of steel chassis supported by two or three transverse axles which had rubber-tired wheels attached to each end. A wooden or a steel-framed body was attached to the chassis and locomotion was provided by one or two large direct current electric motors which were mounted on the chassis beneath the body. Current collection was usually by means of two roof mounted trolley poles since the rubber tires and the consequent maneuverability of the bus precluded the use of most conductors located in the road. The electrical control apparatus on most trolley buses was similar to that found on most streetcars of that time, although foot operated controllers were frequently supplied with trolley buses since the operator had to steer the bus as well as control its speed. (Whyte, 1911, pp. 60-63)

Superintendent Cunningham was impressed by the maneuverability of the trolley bus and its economy of operation. In a 1931 report on the future of public transportation in Edmonton, Cunningham stated that he believed that trolley buses could be used in the near future in Edmon-

ton, in order to provide new routes to the newly-developed areas of the City and to replace streetcars on unremunerative lines or on lines in need of expensive track repair. (Canadian Railway and Marine World, November 1931, p. 723) Although the trolley bus was used in England and in various centres in the United States, no Canadian cities were operating trolley buses at that time. (Canadian Transportation, June 1946, p. 321) In addition, no trolley buses were being manufactured in Canada whereas both streetcars and motorbuses were. In order to operate trolley buses, the SRD would have had to import the rolling stock from either Great Britain or the United States. (Wilson & Bunnell, 1938, pp. 12-15) The depressed economic conditions of that time prevented any further consideration of trolley buses by the SRD for several years.

It was mentioned in Chapter III that much of the street railway track in Edmonton was in deplorable condition and in need of immediate and expensive repair by the late 1930's. In a report to the City Council in December 1937, the Commissioners and Superintendent Ferrier of the SRD pointed out that the street railway was, "the only Utility which has no definite rehabilitation program mapped out ahead. This is due in part to lack of resources and also to the doubtful position of bus development" (CECR, December 22, 1937, p. 1). The report also mentioned the introduction of trolley bus operation in Montreal, Quebec and how that operation had resulted in lower maintenance costs and increased revenues. One of the major recommendations in the report was that a competent consultant be hired to evaluate the system and to recommend changes. (CECR, pp. 3-7)

The City Council followed the recommendation and the Toronto, Ontario consulting firm of Wilson and Bunnell was hired. Their report was submitted to the City Council during April 1938. (Wilson & Bunnell,

1938, preface) The report recommended the gradual replacement of streetcar service by trolley buses, since such vehicles were: inexpensive to operate, since they used the existing power supply; noiseless and odorless, unlike motorbuses; able to transport more passengers than motorbuses; equipped with similar electrical apparatus to streetcars and, therefore, streetcar maintenance crews could also work on trolley buses without extensive retraining; and were classified as streetcars, so they would not require motor vehicle licenses as did motorbuses. (Wilson & Bunnell, pp. 13-17) The initial trolley bus route proposed by the report required six trolley buses in order to be operated properly. (Wilson & Bunnell, p. 1) The City Council adopted the report and most of its recommendations and began to consider the type of trolleybuses that would be purchased. (CEAR, 1938, p. 9)

New Equipment, 1938-1942

The introduction to this Chapter noted that the Wilson and Bunnell report of April 1938 recommended the purchase of six trolley buses for Edmonton's initial trolley bus route. The report noted that Montreal had obtained trolley buses of British manufacture for its system but the report did not recommend the use of British buses in Edmonton,

> Much as we would prefer to recommend the purchase of British made machines, we do not think that Edmonton should assume the writing of specifications for vehicles that would be 'orphans' when made . . . . British made trolleybuses are very fine machines, but their standard models do not fit North American operating conditions, and to do so must be specially designed throughout. (p. 14)

It should be noted that most American trolley buses were constructed as single-deck vehicles, while most British made trolley buses were constructed as double-deck units. The trolley buses constructed for Montreal, however, had been single-deck vehicles. (English Electric Co.

Specifications of Model 663T Trolley Bus, 1938)

The SRD began to solicit bids for the six trolley buses in July, and ceased accepting bids at the end of September 1938. (CECR No. 38, October 11, 1938) Commissioner R. J. Gibb and SRD Superintendent Ferrier both analyzed the bids submitted by American as well as British manufacturers. In addition, Superintendent Ferrier travelled to Montreal and to several American cities to view personally trolley bus operation in those centres. His conclusions were that the British built trolley buses in Montreal provided a smoother ride than any American trolley buses because the British vehicles in Montreal were equipped with three axles. No American companies produced three-axle trolley buses at that time. Based upon this criterion and against the advice of the Wilson and Bunnell report, Superintendent Ferrier and the Commissioners, "eliminated all bids except those of the English Electric Company and the Leyland Company which were the only bids submitted on three axle equipment complying with our specified speeds" (CECR No. 38, October 11, 1938).

The City ordered three trolley buses each from the English Electric Company and Leyland Motors Limited. (English Electric Co. Contract for three Model 663T Trolley Buses, October 18, 1938, and Letter to Commissioner R. J. Gibb from Leyland Motors Ltd., December 27, 1938) The general construction of the two makes of trolleybus was similar to the construction of the SRD motorbuses of that period. Each trolley bus consisted of a chassis composed of steel structural members which were riveted and welded together. Unlike the motorbus chassis, each trolley bus chassis was provided with three axles, one near the front, and two near the rear. The purpose of the dual rear axles was to distribute the heavy weight of the motor and the electrical equipment over a large surface. The bodies of both makes were constructed as

separate units and were connected to the chassis after it was completed. (English Electric Co. Specifications of Model 663T Trolley Bus, 1938, and Leyland Service Manual for Model TTB Trolley Bus, 1939)

The chassis of the three buses ordered from English Electric were manufactured by the Associated Equipment Company (AEC) of Southall, England, while the bodies and the electrical apparatus were provided by the English Electric Company. The final assembly of the components was done by AEC. (AEC Service and Instruction Book for Model 663T Trolley Bus, 1939) Each of the rear axles contained a worm-drive differential which was located near the left-hand side of the chassis. A steel driveshaft with universal joints at both ends joined the driveshaft to each differential. Leaf spring suspension was used between the axles and the chassis. In addition, small spring shock absorbers were placed near both wheels of the front axle. Air operated drum brakes were also placed at the end of each axle. It should be noted that dual tires were not used on the rear axles. (AEC Service and Instruction Book, 1939)

The motor and the control apparatus were manufactured by English Electric and were installed on the chassis before the body was attached. A single type 408A motor with a maximum output of 115 H.P. (85.8 kW) was installed on each trolley bus. The motors were generally referred to as being of the box-frame, compound wound, self-ventilated type. (English Electric Specifications, 1939) Unlike most streetcar motors used on the SRD which had split frames (cases), these trolley bus motors were contained in one-piece steel cases. Although the case was cast in one piece, the ends could be removed in order to facilitate component removal. The term "compound wound" meant that in addition to field coils, this type of motor possessed another set of coils called shunt coils, which

were located in between the field coils. The shunt coils were designed to further control the speed of the motor. The term "self-ventilated" referred to the fact that the armature shaft of this type of motor held a metal fan which drew air into the motor when it was in operation. The air served to cool the motor's windings. (English Electric Co. Specifications, 1938)

The motors on these trolley buses were located near the centre of the chassis and were secured to it with several bolts. Rubber bushings placed on the bolts between the motor case and the chassis were designed to limit the amount of motor vibration transmitted to the chassis. Power was transmitted from the motor to the rear axles through a steel drive shaft. A special type of drum controller, designated KM-805A, was located near the front of the chassis. This controller was designed so that the interior drums were aligned horizontally. The controller was placed so that it was underneath the operator's seat. By aligning the controller in this position, the movement of the power drum (power shaft) could be controlled by a foot pedal connected to levers. (English Electric Specifications, 1938)

It should be recalled that streetcar motorman in Edmonton normally used their left hands to rotate a streetcar controller's power shaft, while their right hand was used to operate the brake valve. (See Chapter V) The SRD had decided to continue this arrangement with the foot pedals on the new trolley buses since it was believed that the operators of the buses would primarily be former streetcar motormen. The foot pedals on these trolley buses, therefore, were arranged so that the left-hand pedal was connected to the controller, while the right-hand pedal controlled the brakes. (Supplement to English Electric Proposal, October 13, 1938) This pedal arrangement later caused confusion since most

buses and automobiles in Edmonton had the pedals arranged so that the right pedal controlled acceleration.

The operation of the controller and the motor were somewhat different from the arrangement found on Edmonton's streetcars. The purpose of the controller was still to close and to open various control circuits leading to the motor, thus controlling motor speed. Full trolley current was not passed through the controller during the various controller steps. Upon entering the trolleybus body near the front, the positive cable passed through a ceiling-mounted line breaker. A small diameter cable was then connected between the main cable and the controller. The main cable then proceeded beneath the floor of the trolley bus to a steel cabinet which was attached to the top of the chassis at the rear. This cable was connected to one side of several magnetically operated contactors which were located inside the cabinet. The contactors consisted of a single fixed contact made of heavy copper and a hinged moveable contact, also of heavy copper, which was insulated both from the first contactor and from its steel mount. A heavy coiled spring kept the contacts normally open. A large electromagnet attached below the fixed contact was strong enough to close the contacts when it was energized. A braided copper jumper cable connected the moveable contact with the necessary cable. The braided jumper cable was designed so that it did not interfere with the movement of the moveable contact. The copper contacts were more substantial than the fingers and segments found in most controllers. This rugged construction enabled the contactors to pass large amounts of current without sustaining serious damage. The two contacts were shaped so that they curved away from each other. In addition, the contacts were surrounded by a porcelain arc chute. When the controlling electromagnet was de-energized, the spring rapidly

separated the two contacts. When this occurred, an arc was formed between the contacts. The curvature of the contacts, as well as a small electromagnet attached behind the fixed contact, caused the arc to move away from the contacts, thus preventing the arc from remaining on the contacts and melting them. The arc chute diverted the hot arc away from insulated wires and other apparatus that could be burned easily. (English Electric Co. Maintenance Manual, 1939, pp. 20-31)

The contactors were connected to the motor's armature and field coils through various amounts of resistance. As each contactor was closed, the amount of resistance in the circuits leading to the motor was reduced, thereby increasing the motor's speed. (See Chapter V for further information) In addition, other contactors completed a circuit between the positive trolley cable, the shunt fields and the negative trolley cable. The shunt coils were so arranged inside the motor that the magnetic field produced by the shunt coils acted in opposition to the magnetic field produced by the field coils. In this manner, the shunt coils could be used to moderate or reduce the motor's speed. This type of arrangement was necessary for a single motor since the older type of series-parallel control found on two or four motor streetcars could not be used. (English Electric Co. Maintenance Manual, 1939, pp. 20-31)

In normal operation, the operator moved the reverser drum of the controller to the "ahead" position by means of a handle attached to the reverser. The handle was located on the controller case to the left of the operator. When the power pedal was depressed slightly, the controller's power shaft was rotated a short distance. This action caused one of the contactors to close, which provided a circuit to the motor through the maximum amount of resistance. In addition, another contactor was closed which provided full power to the shunt coils. When these

actions occurred, the motor's armature began to rotate and the bus began to move. It should be noted that all the current passing through the motor was directed through another cable which led to the negative trolley pole. No current was supposed to reach the negative trolley pole by passing through either the chassis or the body. As the operator depressed the power pedal further, more contactors were closed which reduced the amount of resistance in the circuit leading to the motor. The strength of the shunt fields was maintained. Like the operation of a streetcar controller, a trolley bus controller could not be left in a resistance step. When the power pedal was depressed far enough, the operator felt a discernable notch which indicated that the controller was on a "running" position (all the resistance had been removed from the motor circuits). This running position could be used indefinitely. At this point, the trolley bus motor was rotating at approximately half-speed. (English Electric Co. Maintenance Manual, 1939, pp. 20-31)

In order to further increase motor speed, the shunt field had to be weakened. This was accomplished by inserting resistance in series with the shunt coil circuit. As the operator depressed the power pedal beyond the first running notch, contactors were closed which connected the shunt coils with different resistance grids from those used for the field coils. When the shunt field was eliminated, a second running notch was felt. At this point, the trolley bus was usually travelling at a considerable speed. It should be noted that the rheostat grids on these trolley buses were similar to the rheostats found on most ERR streetcars. The trolley bus rheostats, however, were placed in a steel cabinet which had forced air directed through it. In cold weather, a damper attached to the cabinet diverted the warm air from the cabinet to a duct inside the bus body where it heated the interior. In warm weather when the

heat was not required, the damper would be closed and the hot air would be diverted outside the bus. (English Electric Specifications, 1939)

The braking system on these trolleybuses was far more complex than either the streetcar or bus braking systems of that time. When the operator released the power pedal, all power was removed from the motor and the shunt circuits. When the brake pedal was depressed, a small auxiliary drum inside the controller was rotated. This drum closed a contactor which half-energized the shunt field. This action not only slowed the speed of the motor, but also induced electricity into the field coils. This electricity was dissipated as heat through the main rheostats. If the operator depressed the brake pedal further, full power was applied to the shunt coils, which further reduced the motor speed. This braking system was known as "dynamic" or "rheostatic" braking. (English Electric Co. Maintenance Manual, 1939, pp. 6-7) Although dynamic braking was effective in greatly reducing the speed of the bus, it could not bring the vehicle to a complete stop. In order to accomplish this, the air brake system was gradually activated when the operator depressed the brake pedal. As the bus slowed, more air pressure was applied to the brake cylinders by the action of the brake pedal. It should be noted that the controller was equipped with an interlock arrangement which cut power to the motor if the brake pedal was depressed at any time. The interlock also prevented the power pedal from being depressed if any of the doors were open. The entire propulsion and braking system was known as "series dynamic" control, or SD. (English Electric Co. Maintenance Manual, 1939, p. 6-7)

In order to reverse the trolley bus, the operator placed the reverser drum in the "reverse" position. The three AEC-English Electric buses were also equipped with two large 30 volt batteries. In addition to

providing power for the body lighting, the batteries could be used to move the bus in the event of a power failure or in the case of a diversion. In order to use battery power for the motor, the operator had to remove the reverser handle from the controller and install it on a changeover switch. When the switch was moved from the "trolley" position to the "battery" position, the batteries were connected in series to a special contactor. When the handle was reinstalled in the controller, the operator could step on a floor mounted plunger switch. This switch closed the contactor which provided a circuit between the batteries and the motor's armature and field coils. The 60 volts produced by the batteries was sufficient to move the bus several blocks at slow speed. A reversal of the procedure enabled the bus to use trolley voltage. (English Electric Specifications, 1938)

In order to keep the batteries fully charged, these buses were equipped with a small motor generator set. The motor operated from trolley voltage and was directly coupled to a 30 volt generator. This apparatus was mounted on the chassis in addition to the batteries. It should be noted that the British electrical codes of that period prohibited the use of trolley voltage for the interior lighting of trolley buses, hence the use of low voltage lighting. (English Electric Specifications, 1938)

A two-cylinder British Westinghouse air compressor was also mounted on the chassis. It was powered by a 3/4 H.P. (0.6 kW) English Electric motor. The air system also contained an alcohol evaporator to prevent suspended moisture in the compressed air from freezing in the air brakes or the door cylinders during cold weather. (English Electric Specifications, 1938)

The chassis was fully assembled and was tested under power before the body was attached. (Photographs of Chassis Testing in Author's

Collection)

The body, which was manufactured at English Electric's body factory in Preston, England, consisted of steel framing which was arc welded together. (Supplement to English Electric Proposal, October 13, 1938) The appearance and construction of the body were similar to the bodies of SRD motorbuses purchased during that time. (See Chapter VI) The flooring, which was raised over the area of the rear wheels, consisted of tongue and groove pine boards. (English Electric Co. Specifications, 1938) The flooring was covered with 3/8 inch (10 mm) thick cork tiles which were glued to the flooring and which were designed to provide insulation on the floor. (Supplement to English Electric Proposal, October 13, 1938) The body was framed for eight windows along the left-hand side and six windows along the right-hand side, in addition to an air operated front door and a treadle operated centre exit door, both fabricated from ash. Most of the side windows could be opened by lowering the upper part of the sash. This design made it difficult for passengers to stick their arms out. A two-piece flat windshield was also provided in addition to a fixed rear window. The external sheathing consisted of steel panels which were screwed to the frame. Water was kept out of the seams by the addition of aluminum molding strips. The interior paneling consisted of this plywood which was painted with enamels after installation. Two louver vents were located near the front of each side above the windows. Additional ventilation was provided by four roof mounted vents placed near the rear of the body. The spaces between the exterior sheathing and the interior paneling were filled with aluminum foil which was intended to act as an insulating material. Aluminum was used instead of felt because aluminum foil was non-combustible, whereas felt could be set on fire by an electrical short-circuit. (English

Electric Specifications, 1938)

The seating, which consisted of tubular cross and longitudinal seats, could accommodate 38 passengers. The seats were upholstered in leather. The interior lighting consisted of 24 ceiling mounted fixtures which were placed in two rows along the length of the body. Each fixture contained a single low voltage incandescent bulb with a bayonet base. (Supplement to English Electric Proposal, October 13, 1938)

The exterior of the body also contained illuminated roller signs at the front and on the right-hand side. The front roller sign was in two separate units. The smaller unit was designed to display route numbers only, while the larger unit was designed to display destinations. The side roller sign could display destinations only. Each windshield half was equipped with an electrically operated horizontal windshield wiper. The device consisted of a rectangular steel frame which was secured to the molding around each windshield section. A shaft with sprockets at both ends was mounted at the top of the frame. A similar shaft and sprocket arrangement was located at the bottom of the frame. A chain was installed which joined the sprockets on each side. Two rubber wiper blades were attached across the chains at an even interval. The blades were placed so that if the sprocket shafts were rotated, the blades would rub down the windshield vertically. A small electric motor attached to the upper sprocket shaft provided the necessary power required to move the wiper blades. This wiper mechanism, although uncommon in Canada, was a common feature found on British buses of that time. (English Electric Co. Specifications, 1938)

Interior heating was provided by hot air obtained from the rheostat cabinet. Supplemental heating was provided by several underseat electrical heaters which were similar in construction and operation to the electric

streetcar heaters described in Chapter V. Electric defrosting units were also provided for each windshield section. A length of resistance wire, enclosed by a protective sheet steel cover, was installed adjacent to the bottom of each windshield section. When in operation, the heaters heated the surrounding air which rose along the windshield and melted any frost on the windshield sections. (English Electric Co. Specifications, 1938)

Neither the roof panels or the carlines were strong enough to support the two required trolley bases and poles. In order for the bases to be mounted on the bus, a heavy steel framework was mounted on the roof. The framework was located in front of the centre exit door. The framework was attached to the carlines with bolts and was enclosed with sheet steel panels for esthetic appeal. (English Electric Specifications, 1938, p. 42) Each trolley bus received its power through two roof-mounted poles which were held by trolley bases. The trolley bases were similar in design to the streetcar trolley bases, but were of lighter construction. The trolley bus trolley bases required only two springs to provide the necessary tension to lift the trolley poles to the wires. The bases supplied with these buses were manufactured by the British firm of Brecknell-Willis and were attached to the roof framework through four bolts which were imbedded in porcelain insulation. (AEC Service and Instruction Book, 1939, pp. 14-16) The use of porcelain insulators eliminated the need for a wooden trolley board. Each trolley pole held a swivel harp and shoe at the end opposite the trolley base. These swivel harps and shoes (described in Chapter IV) were manufactured by the American Ohio Brass Company. Ropes were also attached to each swivel harp assembly and were connected to Ohio Brass trolley retrievers which were mounted on the back of the body. (English Electric Specifications, 1938, p. 13)

A trolley retriever was similar in appearance and construction to a trolley catcher. A trolley retriever consisted, basically, of a trolley catcher and an additional spring. When a trolley pole left the overhead wire, the springs on the trolley base would cause the pole to rise rapidly. This action caused two things to occur. Firstly, the second spring inside the retriever would be tensioned. Secondly, the pawls attached to the retriever's drum swung out. When the pawls swung out, they activated a release mechanism which transferred the tension of the second spring to the retriever drum. This action caused the retriever drum to pull on the rope which lowered the trolley pole. As soon as the pole was pulled down several inches (mm), additional pawls swung out from the drum, which prevented the pole from being pulled up again by the trolley base. In this manner, the trolley pole was pulled clear of the overhead wiring. The bus operator could reset the retriever by releasing the tension on the trolley rope and by replacing the pole on the wire. (Ohio Brass Co. Publication K-334) Each bus was also equipped with two steel hooks which were mounted on the roof of the bus. These hooks enabled the trolley poles to be held down when they were not required. The use of Ohio Brass current collection equipment was probably selected by the SRD because the overhead wiring material was obtained from the Canadian Ohio Brass Company. (See Chapter IV)

It should be recalled that streetcar motormen could climb onto the roofs of SRD streetcars by means of small fixed steps which were located at the corners of the car bodies. Access to the roofs of trolley buses were provided by means of several hinged steps which were located on the right-hand side of the body immediately in front of the centre exit door. (Photographs in Author's Collection) Other roof mounted electrical apparatus included two radio interference suppressors which

were described briefly in Chapter V. One interference suppressor was connected in series with each trolley pole and consisted of a metal housing which contained an inductor and a capacitor. These components were arranged so that they provided a high impedence. This impedence prevented any spurious electrical pulses produced by any trolley bus electrical apparatus from reaching the overhead wires which acted as antennae. (English Electric Specifications, 1938, p. 17)

Each trolley bus was also equipped with the following: corner clearance lamps, wood-framed storm sashes for the side windows, an interior rear view mirror, an exterior left-hand rear view mirror, a speedometer, an indicator lamp which was extinguished when a trolley pole dewired, an electric horn, an air operated horn which was operated by a large hand operated squeeze bulb, a battery charging plug, a single brake light, a single tail light, and two headlights. It should be noted that in keeping with British practices of that time sealed headlamps were not used. Each headlight housing, instead, contained a concave reflector and two 36 W light bulbs, one for the low beam and the other for the high beam. (English Electric Specifications, 1938) In order to ensure passenger safety from electrical leaks and short circuits, all stanchions were insulated with a rubberized material called "Doverite". In addition, a special plug was provided in the body which enabled shop crews to connect an ammeter. The leads to the plug, which was referred to as a "multiple test socket", were connected to the various electrical items in the trolley bus, such as the motor. An additional lead was attached to the body. The ammeter would normally record zero, or a very low current flow, between the electrical apparatus and the body, since both the positive and the negative wiring was supposed to be isolated from the chassis and the body. A high current reading meant that there

was an electrical fault which posed a danger to passengers since they could complete a circuit to ground while boarding or alighting from the bus. (English Electric Specifications, 1938, p. 25)

The SRD expressed a concern about tire traction during the winter months since these trolley buses were to be used on a route with several steep grades. Air operated sanders, similar to those applied to many SRD streetcars, were installed on each trolley bus. The sanding apparatus, manufactured by British Westinghouse, consisted of two sanding bins and two operating levers which were placed on the dash of each but to the right of the operator. Each sand bin was located between the two rear wheels on either side of the bus. The bins were placed beneath the seats at those locations. The discharge pipes were placed so that sand could be deposited either in front of or behind each rear wheel. Each operating lever enabled sand to be deposited either in front of or behind each rear wheel, depending upon which lever was depressed. (Supplement to English Electric Proposal, October 13, 1938, and Air Brakes for Electric Trolley Buses, 1931)

After final assembly, the buses were painted in the SRD bus colors of that time. (See Chapter VI) The areas above the bottoms of the windows were painted ivory. An orange band, approximately 6 inches (152 mm) wide and bordered on either side with thin black stripes, was placed immediately below the ivory. The areas below the lower black stripe were painted dark red. In addition, the molding strip which separated the sides from the roof was also painted black. (Color Photographs by H. Hollingworth) An AEC-English Electric Crest was also affixed to the front of each bus. The number, in gold lettering, was applied to the front and to the rear of the bus. The three AEC-English Electric (EE) buses were numbered 101 through 103. These units were shipped

to Canada by freighter and then transported to Edmonton by rail. The buses arrived in Edmonton during September 1939. (Letter to the City Commissioners from Gorman's Ltd., September 9, 1939; see also Appendix I) Plate 41 (Provincial Archives of Alberta) depicts trolley bus Number 101 on Jasper Avenue during late 1939. The following should be noted: horizontal windshield wipers, side vents, trolley base support framework, and folding steps near the centre exit door.

The other three trolley buses, which were manufactured by Leyland Motors, were very similar to the AEC-EE buses. The chassis of the Leyland units were manufactured by Leyland, while the bodies were manufactured by the Park Royal Coach Works of London. (Letter to the City Commissioners from J. F. Simpson, August 17, 1939) The electrical apparatus was supplied by the British General Electric Company (GEC). (Letter to Commissioner R. J. Gibb from Leyland Motors Ltd., May 20, 1939) The general arrangement of the chassis was similar to the AEC chassis. Propulsion was provided by a single GEC type WT 265 motor which, at a maximum output of 135 H.P. (100.7 kW) was more powerful than the EE 408A motors supplied with buses 101 through 103. (See Appendix I) The operation of the GEC motor was similar to the operation of the EE motors. It should be noted that the GEC motors used a metal ribbon rheostat rather than the traditional cast metal grid. (Letter to GEC from D. L. MacDonald, October 27, 1947) The air compressor and the sanding equipment were provided by British Westinghouse. (Leyland Specifications of Model TTB Trolley Bus, 1938) It should be noted that the low voltage system and the batteries were designed to operate at 12 volts, not at the higher 30 volts on the AEC-EE buses. In addition, a motor generator set was not used on the Leyland buses. Instead, the generator was driven by a belt connected to the shaft of

the main motor. In this arrangement, the batteries were charged only when the bus was travelling at speeds greater than 5.5 miles per hour (8.9 km/h). (Letter to F. J. Simpson from Leyland Motors Ltd., February 13, 1940, pp. 1-2) Leyland's use of this arrangement meant that there was no interchangeability of electrical components between the two makes of British trolley buses in the SRD fleet.

The Park Royal bodies were similar in appearance to the EE bodies and could also seat 38 passengers. Park Royal, however, sheathed their bodies with sheet aluminum which reduced the weight of the body. Six roof mounted air vents were installed in lieu of any side vents above the windows. Small air intake louvers were provided between the tops of the windshield sections and the bottom of the roller sign assembly. It should be noted that these bodies were not equipped with any side roller sign. (Photographs in Provincial Archives of Alberta) In addition to aluminum foil insulation, granulated cork was glued to the interior surfaces of the external sheathing. The cork reduced panel vibration as well as increasing the insulation. The Park Royal bodies were also equipped with most of the items listed for the EE bodies. (Canadian Transportation, August 1939, pp. 410-411) The Leyland trolley buses were also equipped with: a right-hand rear view mirror, metal-framed storm sashes, interior buzzer system, and electrically operated defroster fans for the windshields. Windshield heaters were not supplied with these trolley buses. (Photographs in Provincial Archives of Alberta)

The buses were painted in the same manner as the AEC-EE trolley buses except that the top of the roofs were painted aluminum. (Color Photographs by H. Hollingworth) These buses were numbered 104 through 106. (Letter to Commissioner R. J. Gibb from Leyland Motors Ltd., May 31, 1939; see also Appendix I)

The trolley bus operation proved popular and the City decided to expand the operation. In November 1939, the City decided to order three additional trolley buses, two from AEC-EE and one from Leyland Motors Limited. (Quotation for Trolley Buses from AEC-EE and Leyland Motors Ltd., November 1939) The Second World War had begun by this time and AEC-EE was unable to construct any trolley buses on account of its required war production. The entire order of three trolley buses was placed with Leyland Motors. (Letter to Commissioner R. J. Gibb from Leyland Motors Ltd., April 18, 1941)

Leyland, however, could not begin the construction of these trolley bus chassis until November 1941 because of required war production and because there was an order for several trolley buses for Durban, South Africa ahead of Edmonton's order. (Letter to Commissioner R. J. Gibb from Leyland Motors Ltd., December 20, 1940, and November 11, 1941)

The three trolley buses were to be similar to the three Leyland trolley buses already owned by the SRD. There were to be some mechanical changes, however. The SRD had found that the battery charging arrangement on the first three Leyland trolley buses was unsatisfactory. A larger generator unit or a motor generator set was to be supplied with the new trolley buses. Leyland, however, was unable to obtain 12 volt generators of any sort so they supplied a large 24 volt generator instead. Edmonton had also discovered that the leaf springs on buses 104 through 106 were prone to breakage. Heavier springs were specified for the new trolley buses. (Letter to J. F. Simpson from Leyland Motors Ltd., February 13, 1940)

Leyland buses 104 through 106 did not possess side roller signs or hand rails above the longitudinal seats. These items were to be supplied with the new trolley buses. (Letter to Commissioner R. J. Gibb from

Leyland Motors Ltd., April 18, 1941)

The buses were completed by the end of June 1942 and were shipped to Canada in special convoys during July. Upon their arrival in Canada, the trolley buses were transferred to railroad flatcars which were brought to Edmonton. (Letters to Commissioner R. J. Gibb from Leyland Motors Ltd., July 2, July 10 and July 27, 1942, and Letter to SRD Superintendent T. Ferrier from Waterous Limited, August 18, 1942)

The three trolley buses could not be painted in the appropriate colors in Britain so they were shipped to Canada painted in a grey primer only. These buses were painted and numbered when they reached Edmonton. (Photographs in Corness Collection, and Letter to J. F. Simpson from Commissioner R. J. Gibb, October 16, 1942) The three trolley buses were painted to match the three other Leyland trolley buses in Edmonton. The new trolley buses were numbered 107 through 109. (Photographs in Provincial Archives of Alberta; see also Appendix I)

Equipment Modifications, 1939-1942

Soon after placing the British trolley buses in service, the SRD experienced serious operational problems with them. It was discovered that the motors on the three AEC-EE trolley buses were too small to adequately propel the buses up the steep grades found on the initial trolley bus route. When the buses were loaded and tried to ascend these steep grades, one or more field coils burned out. In order to prevent this action from occurring, the three AEC-EE trolley buses were transferred to another trolley bus route that did not possess any steep grades. (Ferrier, 1946, p. 19)

Problems were experienced with stiff parts during cold weather. This problem existed because the lubricants originally supplied with these

trolley buses were not designed for extreme cold weather use. Different, less viscous lubricants solved this problem. It was also discovered that the tires supplied with the trolley buses were of slightly different dimensions than tires available in Canada. If tires of different sizes were mounted on the same rear axle, the differential would overheat and would usually result in the failure of the differential. If this occurred, an expensive repair resulted. The SRD endeavoured to overcome this problem by matching the tires on each rear axle. In addition, the extreme cold weather in Edmonton had caused some of the differentials to seize because the metal parts inside the housing contracted and bound against each other. To overcome this condition, the SRD machined the differential housings and inserted a thin brass washer between the housing and the worm gear. The washer was flexible enough to permit some cold weather contraction within the differential without seizing. (Ferrier, p. 19)

Problems were also experienced with the battery charging system on the first three Leyland trolley buses. It was mentioned in the previous section that the 12 volt generators on those buses were inadequate for keeping the batteries sufficiently charged. In many instances, the bus lighting became so dim that the bus could not be operated safely. (Letter to F. J. Simpson from Leyland Motors Ltd., February 13, 1940) It was also mentioned that larger 24 volt generators were supplied with the three additional Leyland trolley buses. During 1941, Leyland Motors shipped a number of the new 24 volt generators to Canada as replacements for the original 12 volt units. That batch of generators never reached Canada because they were lost at sea as the result of enemy action. New generators eventually reached Edmonton during 1942. In the interim, the SRD had removed several interior lights on the Leyland trolley buses

in order to conserve battery energy. (Letter to Commissioner R. J. Gibb from Leyland Motors Ltd., April 27, 1942) During this period, heavier leaf springs were also sent to Edmonton for the first three Leyland trolley buses. (Letter to F. J. Simpson from Leyland Motors Ltd., February 13, 1942)

Although the British trolley buses functioned, they experienced some technical problems. In addition, it had been found that the motors in the AEC-EE buses were not powerful enough for Edmonton's terrain. It had also been discovered that it was extremely difficult to obtain parts for these vehicles, a problem that the Wilson and Bunnell report cautioned the SRD about.

New Equipment, 1943

By early 1942, the SRD was experiencing extremely heavy ridership on most streetcar and bus routes. Additional trolley buses were required in order for the SRD to accommodate such increases in ridership. In early 1942, the three Leyland trolley buses (107-109) had not yet arrived so the Commissioners and the SRD investigated the possibility of obtaining additional trolley buses from American suppliers.

During 1938, the Winnipeg Electric Company had started trolley bus service in Winnipeg with several trolley buses manufactured by the Mack Manufacturing Company of Allentown, Pennsylvania. (Canadian Transportation, June 1946, p. 321) The Winnipeg Electric Company had been able to order an additional five such trolley buses early in 1942. (Canadian Transportation, February 1943, p. 37) Commissioner Gibb was able to convince the federal Transit Controller to allow the City to order three such Mack trolley buses since Winnipeg had received permission to purchase such vehicles. (CECR No. 17, May 26, 1942)

The Mack trolley buses were designated model CR and were substantially different from the British trolley buses operating in Edmonton. The Mack units employed an integral chassis and a body design which was similar to many post-war motorbuses purchased by the ETS. The Second World War had ensured that certain strategic materials were in short supply for civilian construction purposes. Two such materials were aluminum and rubber. Because of the restrictions, these Mack trolley buses used steel sheathing where aluminum had been used in the past. (Mack Specification of Model CR Trolley Coach for the City of Edmonton, 1942) The overall length of the framework and the body, not including the bumpers, was 34 feet 5½ inches (10 503 mm). The framework consisted of various sizes of high tensile steel channels which were arc welded together, no rivets being used. It was believed that by using welded joints instead of rivets, the framework of the bus would be stronger and less liable to weakening at the joints. (Mack Specifications, p. 2) The flooring, which was flat except for semi-circular enclosures around the two rear wheels, was composed of 3/4 inch (19 mm) thick waterproof plywood which was painted with a fire-resistant enamel that contained anti-vermin chemicals. The floor covering consisted of green linoleum under the seat areas and brown ribbed linoleum in the aisle areas. The interior wainscoating consisted of masonite panels, while the ceiling consisted of 20 gauge sheet steel panels which were screwed to the carlines. The external sheathing consisted of 18 gauge sheet steel, except for the roof. Most of the exterior panels had a 2 inch (51 mm) thick layer of felt glued to the interior surface for insulaltion and sound-deadening purposes. Most of the roof was covered with 20 gauge sheet steel except the support area for the trolley bases. The trolley bases were placed on a canvas covered plywood platform which was fastened

directly to the carlines. Steel molding pieces around the board prevented moisture from entering the bus. (Mack Specifications, pp. 2-3)

The framework and the body was supported by two axles instead of the three axle arrangement found on the British trolley buses. The rear axle possessed dual tires on each end in order to distribute the weight over a greater surface. The rear axle also possessed a differential that employed a system of dual reduction gearing to transmit torque from the motor to the rear wheels. The driveshaft of the differential was connected to a countershaft situated at right angles to it by means of spiral bevel gears. The countershaft also held a small diameter spur gear (pinion). The pinion engaged a large diameter spur gear which was connected to the axle rods. In this manner, the speed of the motor was reduced by means of the gears before it was transmitted to the axle rods and the wheels. Both the front and the rear axle were supported by leaf springs in addition to hydraulic shock absorbers on each axle. The electric motor was mounted longitudinally at the extreme rear of the underframing. A driveshaft connected the motor with the differential. (Mack Maintenance Manual for Model CR Trolley Coaches, 1942, pp. 706-709)

The interior seating consisted of a combination of tubular cross and longitudinal seats. The seats were upholstered in buffed green leather. The seat backs and the upper framing consisted of plywood and wood pieces since the aluminum normally used for these parts was not available. The stanchions supplied consisted of wooden doweling, while the supports consisted of steel stampings. The seating was arranged to accommodate 40 passengers. Both the front and the centre exit doors were fabricated from wood. The rubber edges on the centre exit doors contained taut steel wires which were attached to a switch inside the door mechanism

compartment. The switch was attached to a circuit that controlled the activation of the opening magnet valve. If a passenger stepped off the treadle and was not clear of the door, the wires inside the rubber edges would be deflected, causing the magnet valve to be opened, which reopened the centre exit door. This feature, called a "sensitive edge", prevented passengers from being injured by the closing doors or from being dragged by the bus after the doors closed. (Mack Specifications, 1942, pp. 5-7)

The electric motor and the control equipment for these buses was provided by the General Electric Company of Schenectady, New York. The main motor, designated type 1213D7, was a compound wound, self ventilating motor that could produce a maximum of 140 H.P. (104.4 kW). The control equipment, designated "MRC", was mounted in a compartment located at the rear of the bus above the main motor. The term "MRC" stood for Magnetic Remote Control. (Thompson, 1940, p. 159) The controller supplied with each bus was not located in the bus interior but was located in a compartment placed behind the front axle. This controller, type 17KC48, was an automatic accelerating cam controller. (General Electric Co. Instructions GEI-17030, 1942, pp. 7-9)

Although the operation of the motor and the contactors were similar to the motors on the British trolley buses, the operation of the General Electric controller was somewhat different. Upon entering the space between the sheathing and the interior paneling, the positive trolley cable branched off to the controller before continuing to a magnetically-closed line breaker on its way to the contactor cabinet. The line breaker was controlled by the actions of the controller. The controller consisted of two horizontally aligned shafts which were formed with several cam lobes. The main camshaft had a notched wheel attached to one end

and a large spring and a lever attached to the other end. A small ratchet tooth called a "latch" was positioned against the notched wheel. The latch enabled the camshaft to rotate counterclockwise only. The latch, in turn, was hinged and was attached to levers that completed electrical circuits or were moved by the action of various electromagnets. The lever at the opposite end of the camshaft was connected to rods and other levers which led to the power pedal, which was placed to the right of the brake pedal on these buses. This pedal arrangement was in keeping with standard North American automotive practice. A strong spring connected to the power pedal kept it in the "up" position normally. The other camshaft, which was smaller, was connected to a rod which was attached to the brake pedal. Both camshafts had several small "fingers" installed above them. Small springs attached to each finger ensured that each rested on a cam lobe. As the camshaft was rotated, the lobes ended at specific intervals. When a cam lobe ended, the finger resting on the lobe would be permitted to drop. The fingers dropped onto contact bars which completed circuits to the contactors in the contactor cabinet. Small rollers attached to each finger reduced the friction between the cam lobes and the fingers. (General Electric Co. Instructions GEI-17030, pp. 7-9)

The movement of the main camshaft was partially controlled by power pedal movement. When the operator wished to proceed, he (or she) had to ensure that the reverser lever in the operator's compartment was in the "forward" position. This lever was connected by rods to the reverser inside the controller. When the operator depressed the power pedal, several events occurred. The main camshaft of the controller was rotated clockwise until it was stopped by the latch on the first notch of the notched wheel. The pressure of the wheel against the latch caused

the latch to pivot slightly. This action closed a contact which completed a circuit to the line breaker which, in turn, energized certain contactors in the contactor cabinet. In addition, as the camshaft rotated, a finger dropped onto a contact which closed one of the contactors in the contactor cabinet. This circuit provided power to the motor's armature and field coils through the maximum resistance. Some of this current was also diverted through a small electromagnet mounted on the controller which acted in opposition to another electromagnet which was part of the controlling circuit to the line breaker. A small contactor was located above the two electromagnets. This arrangement was called the "accelerating relay". The small contactor was not activated at this time because the magnetic field of the electromagnet connected to the motor circuit was stronger than the field of the other electromagnet because of the large current flow through the motor circuit. As the motor increased its speed, the magnetic field surrounding the motor electromagnet in the accelerating relay became progressively weaker because the motor drew less current than before. When this occurred, the field surrounding the other electromagnet in the accelerating relay became strong enough to cause the accelerating relay contactor to close. This action could only take place, however, if the operator kept foot pressure on the power pedal. If pressure on the power pedal was being maintained, the closing of the accelerating relay completed a circuit through an electromagnet which was designed to pivot the latch away from the notched wheel. When this action took place, the latch was pulled back momentarily, since the action of pulling the latch back also broke the circuit to the electromagnet which held the accelerating relay closed. In the instant that the latch was pulled back, the camshaft was allowed to rotate to the next notch on the notched wheel. (General Electric Co. Instructions

GEI-17030, pp. 7-10)

As long as the power pedal was depressed, this procedure continued. The controller was designed so that it did not dwell on any resistance notches longer than necessary. When the operator released foot pressure on the power pedal, the camshaft would be rotated counterclockwise by the action of the return spring until it reached the position determined by the position of the power pedal, or until the camshaft reached the "off" position. In the "off" position, the line breaker was opened and all power to the motor and shunt circuits was cut off. In braking, a slight pressure on the brake pedal caused the brake camshaft to rotate, closing the line breaker circuit and which closed contactors which energized the shunt coils. In addition, other contactors were closed which connected the motor's armature and its field coils to the trolley cables. The voltage induced into the field coils by the action of the shunt field was higher than the trolley voltage so power was sent into the trolley cables. This form of braking was known as "regenerative braking" since the motor acted as a generator during part of the braking sequence. If the operator depressed the brake pedal further, air braking was blended with additional regenerative braking. As the trolley bus slowed down, the regenerative braking was reduced while the air braking was increased. In this manner, a smooth stop was obtained. It should be noted that this type of equipment had no provision for battery propulsion of the main motor. (General Electric Co. Instructions GEI-17030, pp. 7-10)

The air compressor supplied with these buses was a General Electric type CP-37 compressor. This was a two-cylinder compressor that had been specifically designed for trolley bus service. The compressed air from the compressor was passed through a 4 foot (1 219 mm) length of finned copper tubing before it entered the first air reservoir. The

purpose of the tubing was to cool the air heated during compression so that it would drop most of its condensate in the first reservoir. Another length of finned copper tubing joined the first reservoir to a second in order to reduce further the moisture content of the air. An alcohol evaporator installed in the system further reduced the risk of moisture freezing in the system. It should be noted that the General Electric equipment did not include sanding equipment. (Mack Specifications, p. 14)

The trolley bases supplied with these buses were manufactured in the United States by the Ohio Brass Company. Their form 11T trolley base was readily available and was considered superior to the British trolley bases because of the use of needle bearings and roller bearings in all moveable joints. (Mack Specifications, p. 11, and Ohio Brass Co. Publication K-361) The trolley bases were secured to a thick board which was attached to the canvas-covered roof section. The bottoms of the trolley bases were covered by a sheet steel cowling which had been fabricated of sheet aluminum before the Second World War. (Mack Specifications, 1942, pp. 11-12) While Ohio Brass harps, shoes and poles were used, Ohio Brass trolley retrievers were not used. The SRD had discovered that the Ohio Brass retrievers had a large number of moveable parts which made that type of retriever extremely difficult to repair. Retrievers manufactured by the Earll Company of York, Pennsylvania were supplied instead. (Mack Specifications, p. 12) It should be recalled that the ERR, in 1915, had selected Earll trolley catchers for its streetcars. (See Chapter V) The trolley pole hold-down hooks were mounted on insulators on these buses as an added safety feature. (Mack Specifications, p. 12)

Interior heating was provided by the rheostats as well as by a number

of electric heaters which were also located in the rheostat cabinet. Air for the cabinet was drawn from the outside through two louver vents which were located in the sides of the bus near the rear. An electric blower unit inside the cabinet constantly moved air through it in order to keep the rheostats cool. The hot air from the cabinet could be distributed through the interior of the trolley bus by floor ducts on either side when the thermostatically-controlled damper permitted. Windshield defrosting was accomplished by means of two small compressed air operated fans. Interior ventilation was provided by the windows in addition to four roof-mounted vents and two hinged vents located above the headlights at the front of the bus. (Mack Specifications, p. 8)

The interior lighting of these buses was similar to that found on the British trolley buses. Power for the lights was provided by a small 12 volt motor generator set which charged a small 12 volt battery. Two dual filament sealed beam headlights were provided with each bus as well. (Mack Specifications, p. 10) Two air operated windshield wipers of the vertical oscillating type were installed on each bus. (Mack Specifications, p. 8 & p. 10)

Each bus was painted in the SRD colors but without the orange band and the black stripes. This paint scheme, therefore, moved the ivory areas below the bottoms of the windows. Each bus was numbered on the front and the rear only. (Mack Photographs CR-1277-143V6203 to CR-1277-143V6206) The trolley buses were numbered 110 through 112 and were shipped to Edmonton late in January 1943 and arrived in Edmonton during February. (Telegram to Commissioner R. J. Gibb from Mack Manufacturing Co., January 26, 1943) Plate 42 (Glenbow Archives) shows trolley bus Number 112 on Jasper Avenue during 1943. The different body shape as compared to the AEC-EE trolley bus in Plate 41,

Plate 42. (Glenbow Archives) Trolley Bus Number 112 in 1943

Plate 43. (Provincial Archives of Alberta) Trolley Bus Number 119

as well as the single rear axle, vertical windshield wipers, the lack of a steel framework for the trolley bases and the plain paint scheme should be noted.

New Equipment, 1944-1945

The need for additional trolley buses continued despite the arrival of the three Mack trolley buses. By this time, the Canadian Transit Controller had jurisdiction over what equipment civilian transportation systems could purchase. In addition, the American War Production Board had restricted the production of trolley buses to only one manufacturer, the Pullman-Standard Car Manufacturing Company of Worcester, Massachusetts. In spite of these difficulties, the SRD was able to order eight Pullman-Standard trolley buses in early August 1943. (Telegram to Transit Controller G. S. Grey from Commissioner R. J. Gibb, August 3, 1943)

The construction of these buses was similar to the construction of the Mack trolley buses. The Pullman-Standard units, model 41CS-100-44CX, were somewhat longer than the Mack trolley buses because the Pullman-Standard units possessed a long overhang beyond the front axle which enabled these trolley buses to be equipped with double-width front doors. Each door was provided with its own operating cylinder and could be opened independently of the other. (Pullman-Standard Co. Specifications, 1944) The double-width front doors were designed to speed the loading and the unloading of passengers. The exterior sheathing on these trolley buses below the windows consisted of steel panels with horizontal ribs in them for additional panel strength. In most other respects, the interior and exterior appointments on the Pullman-Standard trolley buses were similar to those on the Mack trolley buses. There were several differences, however. The seats and the stanchions were

all composed of steel instead of wood, which had been used on the Mack units. The seating on the Pullman-Standard buses was arranged to accommodate 44 passengers. It should be noted that every metal stanchion was insulated from its base as an added protection from electric shock. The air intake for the rheostat cabinet consisted of a low flat air scoop located on top of the roof near the rear of the bus. This design of air intake was intended to provide a positive air pressure to the heating system but it also permitted large amounts of snow to enter as well. (See Plate 43)

The SRD had been pleased and satisfied with the operation of the General Electric motors and control equipment on their Mack trolley buses and specified that the same apparatus be supplied with the Pullman-Standard trolley buses. (Letter from General Electric Co. to the City Commissioners, September 22, 1943, and Pullman-Standard Co. Specifications, 1944) General Electric had modified their MRC control equipment slightly so that dynamic braking was used instead of regenerative braking. (Letter to Gorman's Ltd. from Commissioner R. J. Gibb, August 29, 1944) Dynamic braking was used because General Electric had received complaints from several trolley bus operators that regenerative braking had been damaging the older types of motor generators located in power plants and substations. (General Electric Co. Instructions GEI-17030, 1942) In addition, the controller was mounted in the contactor cabinet at the rear of the trolley bus. (Photographs in Author's Collection)

Westinghouse air brake equipment was supplied with these buses in addition to sanding equipment which could deposit sand in front of each rear wheelset. (Pullman-Standard Co. Specificlations, 1944, and Letter to Gorman's Ltd. from Commissioner R. J. Gibb, August 29, 1944) The air compressor supplied was a type DH-10 two cylinder unit which was

similar in design to the GE CP-37 compressor. (Pullman-Standard Co. Specifications, 1944) The sanding equipment was probably installed on these buses because it was available from Westinghouse, whereas such equipment had not been available from General Electric for the Mack trolley buses.

Two Ohio Brass form 11T trolley bases were installed on each bus. In order to increase the longevity of the canvas-covered roof section, each trolley base was mounted on a 1 3/4 inch (44 mm) thick yellow pine board which was attached to the mounting base with insulated studs. In this manner, the trolley bases were supported several inches (mm) above the roof. (Pullman-Standard Specifications, 1944) The remainder of the current collection apparatus was the same as that supplied with the Mack trolley buses.

The Pullman-Standard buses were painted in a similar fashion to the Mack trolley buses except that two thin black stripes were added. One stripe separated the red areas from the ivory areas while the second stripe ran along the tops of the side windows and angled down at both the front and the rear of the bus. (Photographs in City of Edmonton Archives) The eight trolley buses were numbered 113 through 120 and were delivered to Edmonton during July 1944, almost one full year after they had been ordered. (Letter to Pullman-Standard Car Mfg. Co. from Commissioner R. J. Gibb, August 14, 1944) Plate 43 (Provincial Archives of Alberta) shows the left-hand side and the rear of Pullman-Standard trolley bus Number 119 at one point during 1944 or 1945. The following should be noted: rear air scoop, trolley base board, radio suppression coils, Earll trolley retrievers and the trolley pole hold-down hooks.

During early 1944, the SRD determined that it required an additional eight trolley buses in the near future. Permission for the purchase was

secured from the Transit Controller and the eight trolley buses were ordered from Pullman-Standard during June 1944, since that company was the only manufacturer authorized to construct trolley buses at that time. (Letter to Commissioner R. J. Gibb from Pullman-Standard Car Mfg. Co., June 9, 1944) The trolley buses were supposed to be "exact duplicates in every respect to the eight (8) trolley buses being furnished on the City of Edmonton order No. 4052 . . . [1943]" (Letter to Commissioner R. J. Gibb from Pullman-Standard Car Mfg. Co., June 9, 1944). Wartime availability of certain parts and materials did not permit this, however.

Canvas had become a restricted commodity so the roofs of these buses had to be sheathed entirely with steel panels. Pullman-Standard did not foresee any difficulties with this arrangement since the trolley bases had not been directly supported by the wooden section on the first eight units. (Letter to Commissioner R. J. Gibb from Pullman-Standard Car Mfg. Co., September 29, 1944) The General Electric Company was unable to supply the same type of blower motor that had been supplied with the first eight Pullman-Standard trolley buses so a larger motor was supplied. (Letter to Commissioner R. J. Gibb from Pullman-Standard Car Mfg. Co., July 12, 1944) The steel-framed sashes that had been supplied with buses 113 through 120 were no longer available. The only sashes that were available were of similar design but were composed of extruded aluminum. Because of these changes, these eight Pullman-Standard buses were designated model 44AS-100-44CX. (Letter to Commissioner R. J. Gibb from Pullman-Standard Car Mfg. Co., August 3, 1944)

The eight buses were painted in the same way as the first buses but were numbered 121 through 128. (See Appendix I) Production difficulties delayed delivery of these buses until August and September 1945.

(Letter to Commissioner R. J. Gibb from Pullman-Standard Car Mfg. Co., July 27, 1945; see also Appendix I)

The SRD believed that it required additional trolley buses for 1945; and in December 1944, the City Commissioners approached the Transit Controller for permission to order further units. It should be noted that by the beginning of 1945, it appeared as if the war in Europe would soon be ending. With this prospect, the American War Production Board had enabled another company, ACF-Brill Motors of Philadelphia, Pennsylvania, to manufacture trolley buses as well as Pullman-Standard. In reply to Edmonton's request, the Transit Controller reported that ACF-Brill Motors was considering having its type of trolley buses manufactured in Canada by the Canadian Car and Foundry Company. In view of this development, the Transit Controller stated that he would authorize the purchase of two trolley buses from either Pullman-Standard or ACF-Brill Motors. (Letter to Commissioner R. J. Gibb from Transit Controller G. S. Grey, January 9, 1945) In response to the Transit Controller's information about future Canadian made trolley buses, the City decided to purchase two ACF-Brill trolley buses since it was believed that such buses would be quite similar to the future Canadian-built units. Permission for the purchase was obtained by the end of January 1945. (Letter to Commissioner R. J. Gibb from Transit Controller G. S. Grey, January 2, 1945) By the middle of March, the City had placed the order for the two trolley buses with ACF-Brill Motors. (Letter to Commissioner R. J. Gibb from ACF-Brill Motors Co., March 16, 1945)

The two trolley buses were designated model TC-44 and were similar in appearance and construction to the three Mack trolley buses, Numbers 110 through 112. The TC-44 trolley buses were larger and could, therefore, seat 44 passengers. (Letter to Commissioner R. J. Gibb from

ACF-Brill Motors Co., March 16, 1945) While the general construction of these trolley buses was similar to that of the Mack and the Pullman-Standard buses described previously, aluminum structural members were used for several side supports as well as sheet aluminum for the external sheathing along the sides of each trolley bus. The use of aluminum reduced the weight of these buses so that they weighed less than the Pullman-Standard buses. Like the last order of Pullman-Standard trolley buses, the canvas-covered roof section had to be dispensed with because of the unavailability of canvas. (Letter to Commissioner R. J. Gibb from ACF-Brill Motors Co., March 16, 1945, and Specifications for ACF-Brill Model TC-44 Trolley Coach, January 1945; see also Appendix I) Unlike the Pullman-Standard trolley buses, the TC-44 trolley buses did not contain double-width front doors. In addition, the heating ducts were arranged so that the heated air entered the interior ducts at the centre of the bus in order to provide a more even distribution of heated air. Windshield defrosting was accomplished by an electric heater and an operator controlled electrically driven fan which were located behind a dash panel.

The General Electric Company provided the electrical apparatus as well as the air brake equipment. Sanding equipment was not provided with these buses. Improvements to the MRC control permitted both regenerative and dynamic braking when the brake pedal was depressed. (Letter to Commissioner R. J. Gibb from ACF-Brill Motors Co., March 16, 1945) With this arrangement, some regenerative power could be produced without causing serious damage to substation and power plant equipment. The placement of the controller and the contactors was in a cabinet located along the left-hand side of the bus. This placement was thought to provide easier pedal operation since the control rods would be shorter. (Letter to Commissioner R. J. Gibb from ACF-Brill Motors

Co., March 16, 1945) It should also be noted that from this point to the present, no Edmonton trolley buses have been purchased with sanding equipment. Lack of availability of such equipment combined with the introduction of road sanding vehicles probably contributed to the demise of individual sanding equipments on trolley buses in Edmonton.

The old style GE CP-37 air compressor was no longer available so the TC-44 trolley buses were equipped with a smaller type CP-25 compressor. (Letter to Commissioner R. J. Gibb from ACF-Brill Motors Co., March 16, 1945)

The buses were painted in a similar fashion to the Mack trolley buses but were numbered 129 and 130. The two units arrived in Edmonton during November 1945. (Letter to Commissioner R. J. Gibb from ACF-Brill Motors Co., November 2, 1945)

New Equipment, 1946-1947

On September 30, 1945, the Federal Government revoked the power of the Transit Controller, enabling urban transportation systems to order any equipment they desired. (Letter to Commissioner R. J. Gibb from Transit Controller G. S. Grey, September 13, 1945) In early October, the City placed an order with Canadian Car and Foundry for 22 of the new 44 passenger Brill trolley buses that were to be manufactured in Canada. (Letter to Canadian Car & Foundry Co. from Commissioner R. J. Gibb, October 10, 1945) Canadian Car and Foundry, unfortunately, could not begin work on these units since it had not yet completed the specifications for the trolley buses and was just beginning to manufacture the new model C-36 motorbuses. (Memorandum to SRD Superintendent T. Ferrier from Commissioner R. J. Gibb, September 27, 1945)

The specifications for the new trolley buses were completed during

February 1946. (Canadian Car & Foundry Co. General Specifications of Canadian Car-Brill Trolley Coach Model T-44, February 1946) The new model T-44 trolley bus, like the ACF-Brill model TC-44 trolley buses in the SRD fleet, could seat 44 passengers. The appearance and the construction of the model T-44 trolley bus was significantly different.

The underframing of the buses consisted almost entirely of heat-treated aluminum alloy "I" beams and extruded channels instead of steel. The aluminum structural members were either bolted together or were cold riveted together with aluminum alloy rivets. Certain parts of the framing, such as the motor mounting areas and the front corner posts, were fabricated of steel alloy sections which were bolted to the aluminum structural members. Secondary structures, such as electrical cabinets and ductwork, were fabricated of sheel steel and were spot welded together. (Canadian Car & Foundry Co. Specifications, 1946, p. 3)

The external sheathing and the interior ceiling panels consisted of sheet aluminum which was riveted to the framing. The wainscoating consisted of masonite panels. Non-combustible insulation was installed between the exterior and the interior panels. Each bus possessed a single-width front entrance door as well as a treadle operated centre exit door. The side windows, with the exception of the small windows closest to the rear and the front of the bus, were rectangular in shape. These windows were formed with extruded aluminum and consisted of a stationary upper portion about one quarter the height of the window. The lower portion of each openable window was divided into two sections. The section facing the front of the bus could be slid back in order to open the window. This arrangement provided ventilation while making it difficult for passengers to stick their arms out. (Canadian Car & Foundry Specifications, pp. 3-5) It should be noted that the general

appearance of these trolley buses was quite similar to the appearance of the C-36 motorbuses except that the T-44 buses possessed a small, vertically positioned fixed elliptical window near the front of each side because of the T-44's increased length over the C-36. (See Plate 37 and Appendix I)

The electrical equipment supplied with these buses was quite similar to the apparatus supplied with the two ACF-Brill trolley buses. The motor and the control equipment was manufactured in Canada by the Canadian General Electric Company (CGE). (Canadian Transportation, December 1946, pp. 688-690) The CGE 1213 motor was an altered version of the General Electric 1213D7 motor. The CGE version was altered in order for it to be easily installed on the Canadian Car and Foundry Brill trolley buses, and in order for the motor to function more efficiently in Canada's colder climate. The CGE version of the motor was described as type 1213PA. (CGE List of Electrical Parts for Canadian-built Brill Trolley Coaches) The compressed air for the brakes and the doors was provided by a single GE type CP-25 compressor which was similar to the air compressors supplied with the two ACF-Brill model TC-44 trolley buses. (Canadian Car & Foundry Co. Specifications, 1946, p. 12)

The interior lighting on these trolley buses consisted of two parallel rows of ceiling-mounted fixtures which were wired in series in order to be able to use the trolley voltage. It was believed that better lighting was achieved by using high voltage circuits since brighter light bulbs could be used. (Canadian Car & Foundry Co. Specifications, p. 4) A low voltage power supply was still required for the horn, defroster fan, headlights, tail lamps, brake lamps, clearance lamps, step lamps and the lamps in the front illuminated roller sign. The low voltage system also powered the interior signal system which employed a single-tone chime

rather than a buzzer. A small motor generator and a battery comprised the low voltage system on these trolley buses. The trolley buses were also equipped with directional signals at the front and the rear of each unit. The directional lamps and the flasher operated on the low voltage system. The directional lamps were clustered with the stop and the tail lamps. A special colored glass lens covered each bulb cluster. (Canadian Car & Foundry Co. Specifications, pp. 4-10) It should be noted that the directional lamp arrangement on these trolley buses was identical to that of the C-36 motorbuses. (See Plate 37) The specifications also stipulated that the buses would be painted and numbered before being shipped. (Canadian Car & Foundry Co. Specifications, p. 12)

Although the original order for 22 trolley buses had not yet been started by the time the specifications were issued in February 1946, the City decided to order another 25 similar trolley buses from Canadian Car and Foundry. (Letter to Commissioner R. J. Gibb from Canadian Car & Foundry Co., March 18, 1946)

By late December 1946, the first order of 22 trolley buses was being completed at Canadian Car and Foundry's Fort William (Thunder Bay), Ontario factory and were ready for shipment to Edmonton. The trolley buses were painted in the red and ivory paint scheme that had been also applied to the model C-36 motorbuses. The new ETS decal monograms were also applied to each trolley bus. (See Chapter VI, and Appendix I) The first 22 T-44 trolley buses were numbered 131 through 152 and arrived in Edmonton during January and February 1947. (Letters to Canadian Car & Foundry Co. from D. L. MacDonald, January 29, and February 3, 1947) The second order for 25 trolley buses, numbered 153 through 177, arrived in Edmonton during September 1947. (Telegrams to ETS Superintendent T. Ferrier from Canadian Car & Foundry Co.,

September 6-24, 1947)

Equipment Modifications, 1945-1949

The British trolley buses, Numbers 101 through 109, had been placed under adverse conditions during the Second World War and, consequently, were in need of rebuilding. A persistent problem with the Leyland trolley buses, Numbers 104 through 109, was that the circuit breakers supplied by the GEC were tripping whenever any large amount of current was drawn by the motor. This particularly annoying characteristic was a problem that the SRD had attempted to resolve during the War without success. By the end of 1945, the SRD had secured replacement breakers from the GEC in England who were able to supply equipment to civilian customers once again. (Letter to Commissioner R. J. Gibb from GEC, November 26, 1945)

The Second World War caused problems for the three AEC-EE trolley buses (101-103) as well. In 1946, the ETS began to overhaul the motors on these trolley buses. Part of the overhaul included the replacement of the motor field coils. During the War, many of the specifications for these buses had been destroyed during enemy bombing raids so English Electric did not possess the correct specifications for the required field coils. The ETS, therefore, inadvertently received field coils which were suitable for the Montreal AEC-EE trolley buses but which were unsuitable for the Edmonton units. This problem was not realized at first, with the result that all three Edmonton AEC-EE buses were out of service by the end of January 1947. (Telegram to AEC of Canada Ltd., from Commissioner R. J. Gibb, January 29, 1947)

After many unsuccessful attempts at installing replacement field coils, it was discovered that the replacement field coils were not designed

for the EE type 408 motors on Edmonton's units. (Letter to Gorman's Ltd. from AEC of Canada Ltd., February 3, 1947) Proper field coils were eventually manufactured by EE and were supplied to the ETs by the end of May 1947. (Letter to Montreal Tramways Co. from D. L. MacDonald, June 12, 1947)

The rebuilding of the British trolley buses continued during 1948 when the ETS replaced the low voltage interior lighting with the new high voltage equipment which was similar to the apparatus installed in the new Canadian Car and Foundry T-44 trolley buses. (Letter to Railway & Power Engineering Corp. from D. L. MacDonald, January 14, 1948) In addition, directional signals were also installed on these buses. (Letter to Canadian Car & Foundry Co. from D. L. MacDonald, March 4, 1948) During this rebuilding, the large batteries used for off-wire meaneuvering were removed since very few trolley buses in Edmonton's fleet were equipped with this feature. The batteries were also expensive to maintain, which added to the operational cost of these vehicles. The pedal arrangement on these buses was also reversed at this time so that they conformed to the pedal operation on the other ETS trolley buses, thus reducing the likelihood of operator confusion. (Letter to Montreal Tramways Co. from ETS Assistant Superintendent D. L. MacDonald, January 27, 1949)

Certain parts could not be obtained for these buses. The metal bellows-type oil seal, which was used between the axle housings and the driveshafts, was one such part. In order to keep the vehicles in service, the drive assembly in one of the rear axles in each British trolley bus was removed. The remaining driving axle was fitted with a special flat seal and spring retainer which was designed by ETS personnel. (ETS Drawing of Application of Gits D.P.-3000 Hispeed Seal) The removal of one of the axle drives meant that the British trolley buses could be

used only on those trolley bus routes which did not have steep grades. (Letter to Montreal Tramways Co. from ETS Assistant Superintendent D. L. MacDonald, January 27, 1949) The rebuilding of these buses also included: repainting in the ETS colors then in use, the application of the decal monograms, the replacement of the electrical horizontal wipers with air-operated vertical wipers, and the installation of sealed beam headlights. (Photographs by E. M. Smith) Following the rebuilding, these trolley buses were primarily used for peak-hour service. (Letter to Montreal Tramways Co. from ETS Assistant Superintendent D. L. MacDonald, January 27, 1949)

During this period, the Mack and the Pullman trolley buses were also fitted with high voltage interior lighting as well as directional lamps. (Letter to Canadian Car & Foundry Co. from D. L. MacDonald, March 4, 1948) The directional light clusters replaced the older separate tail and stop lamps originally installed on these trolley buses. Each bus was also repainted as it received the new equipment. (Photographs in Provincial Archives of Alberta, and Photographs in City of Edmonton Archives)

New Equipment, 1948-1949

The ETS continued to order Canadian Car-Brill model T-44 trolley buses during this period. One significant factor for this was the imposition of stiff trade barriers between Canada and the United States, which made the prices of American trolley buses considerably higher than Canadian-built units. (Letter to ETS Superintendent T. Ferrier from Pullman-Standard Car Mfg. Co., December 23, 1947) On March 31, 1948, the ETS ordered 10 model T-44 trolley buses from Canadian Car and Foundry for delivery before the end of that year. (Canadian Car & Foundry Co. Contract for Model T-44 Trolley Coaches, March 31, 1948)

The ten trolley buses were to be similar to the previous 47 units. The following items were also to be included: wooden-framed storm sashes for all side windows; ceiling-mounted farebox lamp; an alcohol evaporator for the compressed air system; a sheet metal partition around the operator's position; hand brake splash shield; brake drum dust shields; and additional hand rails and stanchions. (Letter to Canadian Car & Foundry Co. from D. L. MacDonald, April 21, 1948)

The buses were completed and were delivered to Edmonton during November and December. The buses were numbered 178 through 187. (Telegrams to ETS Superintendent T. Ferrier from Canadian Car & Foundry Co., November-December 1948) In addition to the extra equipment described above, the Canadian Car and Foundry made several changes. The older type of sliding window was replaced by a lift type in which the entire lower portion of the sash could be raised. All of the electrical contactors, relays and fuses were located in the compartment along the left-hand side of the trolley bus. In the past, some of the auxiliary contactors, relays and fuses had been located in a separate cabinet which was located at the extreme rear of the trolley bus. (Author's Photographs) It is probable that electrical apparatus was centralized in the single cabinet in order to facilitate repairs as well as maintenance. One change that the Canadian Car and Foundry had introduced on their model C-36 motorbuses (and one which the ETS did not wish to have on its model T-44 trolley buses), was the use of sheathed flexible cables in place of the older type of solid control rods. The ETS had experienced serious freezing problems with the flexible cables on their C-36 buses and did not wish to have the same problems occur on the new T-44 trolley buses. (Letter to ETS Assistant Superintendent D. L. MacDonald from Canadian Car & Foundry Co., July 6, 1948)

Another five T-44 trolley buses were ordered during May 1949. These buses were the same as the buses supplied in the previous order. One particular feature that the ETS did not wish to have on these units was the lift type of windows that had been supplied with trolley buses 178 through 187. The ETS crews had found it difficult to replace the glass in this type of window and had found glass replacement easier with the older design of sash. (Letter to Canadian Car & Foundry Co. from ETS Assistant Superintendent D. L. MacDonald, May 12, 1949) The Canadian Car and Foundry, however, could not obtain the older type of sash so the ETS had to accept the vertical lift sash. (Letter to ETS Assistant Superintendent D. L. MacDonald from Canadian Car & Foundry Co., May 23, 1949)

The five trolley buses, numbered 188 through 192, were delivered to Edmonton during November and December 1949. (Telegrams to ETS Superintendent T. Ferrier from Canadian Car & Foundry Co., November-December 1949; see also Appendix I) These were the last model T-44 trolley buses to be purchased by the ETS. (See Appendix I)

Equipment Disposal, 1950-1954

During this period, the nine British trolley buses were retired from service. All were out of service by the end of 1951 because they were expensive to maintain and were not popular with either the passengers or the operators. (ETS Repair Foreman's Logbook, and ETS Report on 1951 Trolley and Motor Coach Requirements, March 1951, p. 1) All of the retired vehicles were stored outside the Cromdale car barns until early 1954 when they were sold as scrap. (Photographs in Corness Collection) In 12 years of service, the British buses had become "orphans" and were disposed of because of the high cost of replacement parts and

because the vehicle design had rapidly become obsolete; points that had been mentioned in the Wilson and Bunnell Report of 1938.

New Equipment, 1952-1954

During 1951, the ETS had terminated streetcar service and had found itself short of rolling stock even though every effort had been made to obtain additional motorbuses. (See Chapter VI, and Letter to Commissioner D. Menzies from Twin Coach of Canada, April 11, 1951) Although Canadian and American involvement in the Korean War had adversely affected the production of motorbuses, trolley buses were still readily available. In view of this situation, the ETS ordered four large model trolley buses from the Canadian Car and Foundry during December 1951. (Letter to the City Commissioners from ETS Superintendent D. L. MacDonald, March 3, 1952)

These trolley buses, which were designated model T-48A, were larger than the T-44 model and could seat 48 passengers. The T-48A model trolley bus was similar in appearance to the model T-44 but the T-48A did not possess the small eliptical window near the front of the bus on the left-hand side. In addition, the T-48A trolley bus had a longer front overhang which enabled these buses to be equipped with double-width front doors. (Canadian Car & Foundry Co. Specifications of Canadian Car Brill Model T-48A Trolley Coach, April 1950)

The construction of the T-48A trolley bus was somewhat different from the construction of a T-44. The underframing of the T-48A bus consisted primarily of steel members rather than aluminum alloy. (Canadian Car & Foundry Specifications, April 1950) The use of steel members in the longer trolley bus reduced the likelihood of premature frame fatigue. The electrical apparatus for the T-48A trolley bus was identical

to the apparatus supplied with the model T-44 trolley bus. (Canadian Car & Foundry Co. Specifications, April 1950)

The four model T-48A trolley buses were painted in the standard ETS colors and were numbered 193 through 197. They were delivered to Edmonton during March 1952. (ETS Listing of Buses, 1955; see also Appendix I) Plate 44 (Author's Photograph) shows the appearance of T-48A trolley bus Number 195 in early 1977. The wooden storm sashes should be noted. The ETS cast aluminum crest visible in this plate was applied to this bus sometime during the 1960's.

An additional six model T-48A trolley buses were ordered during August 1954 and were delivered to Edmonton by the end of that year. (CECR No. 24, August 9, 1954) These buses were similar to the previous order of T-48A trolley buses received by the ETS. The seating arrangement on the six new trolley buses was altered so that single cross seating was installed along the left-hand side of each bus in order to provide more room for standees. This seating arrangement reduced the total seating capacity on these trolley buses to 42. (Author's Photographs) The six new T-48A trolley buses were numbered 197 through 202 and were the last new trolley buses purchased by the ETS until 1973. (See Appendix I)

Equipment Modifications, 1954

It was mentioned in the previous Chapter that the ETS introduced the use of fibreglass replacement panels on their buses during 1954. The use of such panels was also extended to the trolley bus fleet. (Edmonton Journal, October 18, 1954, p. 21) The use of fibreglass panels was facilitated on the model T-44 and T-48A trolley buses since their body panels were the same, in most instances, as the body panels on

Plate 44. (Author's Photograph) Trolley Bus Number 195

Plate 45. (Author's Photograph) Trolley Bus Number 216, Modified Rear Section

the C-36 motorbuses. (See Plates 37 and 44)

Equipment Modifications, 1959-1965

The operation of the air suspension system installed on new GMC motorbuses beginning in the 1950's was described in Chapter VI. The chapter also mentioned that the Twin Coach Company of Canada had developed an air suspension conversion kit for several types of ETS buses that were equipped with leaf springs. The kits had been developed in an attempt to reduce spring maintenance on the buses equipped with leaf springs. (See Chapter VI)

The trolley buses suffered from frequent spring breakages in addition to the motorbuses; in early 1960, the ETS began to install air suspension conversion kits on the Canadian Car and Foundry trolley buses in their fleet. In the previous year, the ETS had attempted to install a conversion kit on one of the Pullman-Standard trolley buses, Number 115. The conversion did not work well with this trolley bus because it possessed very long leaf springs. (Letter to Twin Coach of Canada from ETS Assistant Superintendent of Maintenance B. H. Booth, March 9, 1960) It was eventually decided by the ETS not to install air suspension on the Pullman-Standard trolley buses because they were due for retirement by the end of 1965. The conversion of the Canadian Car and Foundry trolley buses continued and by the end of 1964, all but six of that make had air suspension installed. (Letter to the City Commissioners from ETS Superintendent D. L. MacDonald, December 3, 1964) The remaining Canadian Car and Foundry trolley buses had the air suspension kits installed during 1965. (ETS Repair Foreman's Logbook)

During this period, several Pullman-Standard trolley buses had their roof mounted air intake scoops replaced by side-mounted louvered air

intakes. (Author's Photographs) The new air intake arrangement reduced the amount of moisture that entered the air cooling system. All Pullman-Standard trolley buses did not receive this modification since some units were in poor condition and were due for imminent retirement.

Used Equipment, 1962

By the early 1960's, some of the older trolley buses, such as the Macks and some of the Pullman-Standard units, were beginning to require extensive overhauls if they were to remain in serviceable condition. At the same time, the British Columbia Electric Company of Vancouver was attempting to dispose of its model T-44 trolley buses because they wished to standardize their trolley bus fleet to one particular model, the T-48A. The ETS, therefore, was able to obtain ten Vancouver T-44 trolley buses for less expense than it would have cost the ETS to overhaul its older trolley buses. The purchase of the ten used trolley buses was approved and the units arrived in Edmonton by rail during November. (Memorandum to the City Commissioners from ETS Superintendent D. L. MacDonald, October 31, 1962) It should be noted that no new trolley buses were being manufactured in North America at this time. (Edmonton Journal, January 25, 1960, p. 22)

The ten Vancouver T-44 trolley buses had been manufactured during 1947 and were quite similar to ETS trolley buses Numbers 131 through 177. The Vancouver units, however, contained a gate which was used to open the centre exit door. In addition, these trolley buses possessed a modified wiring system in the interior lighting so that the four lights nearest the front of the interior were somewhat dimmer than the other lamps in the interior. This feature was intended to improve the operator's night visibility. (Author's Photographs)

The ten Vancouver trolley buses were repainted in the ETS colors and received the new ETS cast aluminum crest which was described in Chapter VI. The trolley buses were numbered 203 through 212. (Author's Photographs; see also Appendix I)

Equipment Disposal, 1960-1965

The arrival of the ten Vancouver trolley buses enabled the ETS to retire some of its older trolley buses. The three Mack units, Numbers 110 through 112, in addition to several Pullman-Standard trolley buses were retired and sold for scrap. (Inventory of ETS buses, November 1966; see also Appendix I)

Used Equipment, 1966

In early 1966, the Regina (Saskatchewan) Transit System terminated its trolley bus service. The ETS was able to purchase ten model T-44 trolley buses from Regina. The buses were delivered to Edmonton by rail during March. (Letter to the City Commissioners from ETS Superintendent D. L. MacDonald, March 20, 1966, and Photographs by C. K. Hatcher) These trolley buses had been manufactured during 1949 and were similar to ETS units 188 through 192. The trolley buses were placed in service immediately and were gradually repainted and renumbered. The ten Regina T-44 trolley buses were numbered 121 through 130 by the ETS. (ETS Listing of Buses, 1966) It should be noted that these numbers had been used previously for some of the Pullman-Standard trolley buses as well as for the ACF-Brill trolley buses.

Equipment Modifications, 1962-1967

During this period, the Canadian Car and Foundry trolley buses

were repainted and were decorated with the new aluminum ETS crest instead of the fragile decal monogram. (Author's Photographs; see also Chapter VI)

Equipment Disposal, 1966

The arrival of the ten Regina trolley buses enabled the ETS to retire the remaining Pullman-Standard trolley buses as well as the two ACF-Brill units. (Inventory of ETS Buses, November 1966) One Pullman-Standard trolley bus was preserved by the ETS. This came about not because of the ETS but because of the request of a private citizen. (CECR No. 47-2, August 24, 1965) The unit selected was Number 116. For some obscure reason, the ETS decided to renumber the unit 113, which had been the number of the first Pullman-Standard trolley bus. (Author's Photographs; see also Appendix I)

Equipment Modifications, 1967-1970

The clustered tail light housings on the Canadian Car and Foundry buses were frequently difficult to see. In addition, it was becoming difficult to obtain parts for them. The former Vancouver trolley buses also possessed additional tail light housings which were not a standard feature in the ETS fleet. On some of the Canadian Car and Foundry buses, the ETS installed three separate lamp housings for each single tail light housing. The lamp housings were arranged vertically and were mounted flush with the back of the bus. The directional lamp was the uppermost. The stop light was in the centre and the tail light was placed at the bottom. Each lamp was enclosed by a 4½ inch (11.4 mm) diameter red lens. (ETS Drawing of Tail Lamp Conversion, 1967) Although the new tail light arrangement resulted in improved visibility, several trolley

buses did not receive the new tail light configuration. (Author's Photographs)

Used Equipment, 1969

During 1969, the City of Winnipeg was in the midst of closing its trolley bus system. The ETS was able to purchase 15 model T-44 trolley buses from Winnipeg for parts only. (ETS Interdepartmental Memorandum from S. R. Daviss, December 1969; see also Appendix I) The ETS received the buses complete and removed items such as: main motors, air compressors, trolley poles, trolley bases, differentials, rheostats, blower motors, windshields, miscellaneous windows and doors. Following the removal of all useful parts, the buses were sold as scrap. (ETS Listing of Disposals, July 6, 1972, and Author's Photographs) The salvaged parts were used to maintain the existing ETS trolley bus fleet. (Memorandum to ETS General Manager D. L. MacDonald from Director of Equipment S. R. Daviss, August 3, 1971)

New Equipment, 1973-1976

Without the acquisition of new trolley buses, the ETS could not hope to keep the trolley bus system functioning. Many of the T-44 trolley buses were over 25 years old and some were developing structural cracks. During 1970, however, the TTC embarked upon a trolley bus rebuilding program. The TTC possessed a large number of trolley buses that were in dire need of replacement. Instead of abandoning the pollution-free trolley buses for diesel buses, the TTC purchased new bodies, had the electrical apparatus stripped from the old units and rebuilt, and installed the rebuilt electrical apparatus in the new bodies. The new trolley bus bodies were supplied by the Western Flyer Company of Winnipeg, Manitoba

and were an unpowered version of the model D700 motorbus. (Canadian Coach, June 1971, pp. 3-5; see Chapter VI for description of the Western Flyer model D700A motorbus) The TTC installed the rebuilt electrical equipment on each unit. When complete, the TTC had a new trolley bus although with rebuilt electrical apparatus that was technologically obsolete. (Canadian Coach, June 1971, pp. 3-5)

Other cities became interested in the procedure started by the TTC and in early 1972, TTC trolley bus Number 9213 was sent to Edmonton for demonstration purposes. (Canadian Coach, February 1972, p. 7, and Photograph by J. A. Kernahan) The ETS was impressed with the appearance and the performance of the new trolley bus and in early 1973, the City Council approved the order of 37 trolley buses of this kind. (Canadian Coach, May-June 1973, p. 17) By this time, the Western Flyer Company had become Flyer Industries Limited and the new 800 series buses were being manufactured. (See Chapter VI) The trolley buses ordered by Edmonton were designated as model E10240 and were similar in construction and identical in appearance to the model D10240 motorbuses that were described in Chapter VI. The model E10240 bus did contain some differences in construction. A new double-reduction rear axle was provided with each bus. In addition, the rear compartment and the underframing of the bus was designed to support a CGE 1213 motor in addition to the required control apparatus. The rheostats were to be placed in a cabinet which was located near the centre of the bus. This cabinet also contained new auxiliary heaters. The cabinet was connected to the wall type of heating distribution ducts that were also found on the model D10240 buses. A separate electric fan operated from trolley voltage provided the air flow for the interior heating of the trolley bus. An electric defroster and fan assembly were also installed

in front of each trolley bus. The design of the heating system on these units meant that storm sashes were not required. Each trolley bus could seat 44 passengers. Each bus was also equipped with insulated trolley boards and a section of rubber matting placed on the roof behind the trolley boards provided additional insulation for any individuals working on the roof. The cowling for the trolley bases was also supplied and it consisted of fibreglass. (Flyer Industries Specifications of Series 800 Trolley Coach, 1973) A re-location of Flyer's factory delayed the production of these units. The first trolley bus was delivered incomplete to the ETS during October 1974. The final fitting of the remanufactured electrical apparatus was undertaken at the ETS facilities. (Edmonton Transit News, November 1974, p. 1)

The unit was powered by a factory reconditioned CGE 1213 motor in addition to a reconditioned and modified cam controller. New contactors and relays were provided. The motor and the controller were obtained from one of the former Winnipeg trolley buses purchased during 1969. (Memorandum to ETS General Manager D. L. MacDonald from Director of Equipment S. R. Daviss, August 3, 1971) One significant change to the control system was the elimination of the power control rod.

A common complaint associated with the Pullman-Standard trolley buses (which also had the controller located at the rear of the bus) was that pedal operation was quite stiff because of the extreme length of the control rods. A system of air operation for the controllers was devised and installed on the new Flyer trolley buses. The power pedal was connected to a return spring as well as to an air controlling valve. The air valve controlled the amount of air pressure admitted to a pipe which led to a small air cylinder connected to the controller's main

camshaft lever. The action of the power pedal would, therefore, be transferred to the controller without much foot pressure. In normal operation when the power pedal was depressed, the air valve allowed a certain amount of compressed air to reach the controller cylinder. The piston in the cylinder would be moved and, in turn, would move the lever attached to the controller's main camshaft. When the operator removed foot pressure from the pedal, the air valve would allow the compressed air to escape. A return spring inside the air cylinder forced the piston back to its original position which, in turn, would move the controller back to the "off" position. The remanufactured control equipment provided for dynamic braking but did not permit regenerative braking. The compressed air for the bus was supplied by a reconditioned GE Air compressor. (Author's Observations)

Tests with the first unit revealed some serious problems with the remanufactured electrical apparatus. In the past on streets where a double set of trolley wires existed, an operator could transfer the trolley poles onto the set of wires above the opposite side of the street in order to be able to maneuver the trolley bus around a large accident or some other temporary obstruction. When this operation was attempted with the new Flyer trolley bus, various relays and contactors overheated to the point where they began to burn. It had become apparent that some of the new components had not been designed to ignore changes in polarity. (ETS Interdepartmental Memorandum from Director of Equipment S. R. Daviss, November 25, 1974)

The electrical problems were eventually corrected and the bus was numbered 213 and was placed in service. (Author's Photographs)

The remaining 36 trolley buses were outfitted with the electrical and the air apparatus at the Flyer factory. The motors and air compres-

sors for these units came from various Canadian Car and Foundry trolley buses retired from the ETS fleet as well as from 20 Calgary trolley buses which the ETS purchased for parts during 1974. (Letter to Calgary Transit System Superintendent of Maintenance D. Miller from ETS Director of Equipment S. R. Daviss, July 26, 1974; see also Appendix I)

Serious labor difficulties within Flyer Industries delayed the completion and the delivery of the remaining trolley buses. (Edmonton Journal, August 1, 1975, p. 7) Twenty-three units were delivered to the ETS during 1975. They were Numbers 214 through 234 and Numbers 236 and 237. The remaining 13 units were delivered during 1976. (ET Listing of Buses, 1976) Plate 40 (Author's Photograph) shows the appearance of trolley bus Number 247 during 1978. It should be noted that the ET insignia and the word "Transit" on the left-hand side of the bus were added during 1976 after the bus had arrived in Edmonton.

Equipment Disposal, 1973-1976

The ordering of 37 trolley buses in 1973 enabled the ETS to retire some of their Canadian Car and Foundry trolley buses that were in very poor condition. As each bus was retired, the electrical propulsion equipment as well as the air compressor were removed for reconditioning and installation on the new Flyer Industries units. (Memoranda from L. F. Wiebe to S. R. Daviss, October 1973-January 1975)

Used Equipment, 1974

During 1974, the Calgary Transit System terminated its trolley bus operations and was disposing of its old equipment. The ETS was able to purchase 20 Calgary trolley buses for the electrical components since the apparatus was required for the new Flyer trolley buses being assembled

for the ETS. The buses were purchased complete. When the required parts were stripped, the bodies were sold as scrap. (Letter to Calgary Transit System Superintendent of Maintenance D. Miller from ETS Director of Equipment S. R. Daviss, July 26, 1974, and Author's Photographs) The units purchased from Calgary included several model T-44 buses as well as some model T-48A trolley buses. (See Appendix I)

Equipment Modifications, 1976-1980

It was mentioned in Chapter VI that in early 1976, the Edmonton Transit System adopted a new paint scheme and insignia and dropped the word "System" from its name. The Flyer trolley buses which had been ordered in 1973 arrived in the old ETS colors and were not immediately repainted in the new ET colors. The new ET insignia as well as the new number placement were applied to these buses. (Author's Photographs) The remaining Canadian Car and Foundry trolley buses, which were gradually being retired, had their numbers reapplied above: the front door, the operator's window, and above the rear window in order for these buses to conform to the new numbering placement. In addition, the old ETS crests were removed and were replaced by strips of adhesive paper with the new ET insignia and the word "Transit". (Author's Photographs) Beginning in 1977, ET began the gradual repainting of the Flyer Industries trolley buses beginning with Number 232. (Author's Photographs) During this period, ET installed two small electric fans on the dash of each Flyer trolley bus since the air flow from the defrosters was usually insufficient in keeping condensation from forming on the lower portions of the windshield inside the bus. (Author's Observations) Edmonton Transit also began to install the new type of roller signs in which the destination portion of the front roller sign was moved by means of a small electric

motor. (Author's Photographs)

One particularly unpopular feature of the Flyer Industries trolley buses was the triangular housing located on the roof of the bus at the rear. This housing, which was designed to enclose optional air conditioning equipment, tended to protrude enough so that the trolley ropes rubbed or snagged against the housing, causing the trolley ropes to fray or the trolley poles to dewire. This housing, which was also found on the diesel model 10240 buses, also interfered with washing operations. In order to alleviate these problems, Flyer Industries fabricated formed metal transition pieces which were designed to replace the superfluous air conditioner housing. (Transit Canada, November-December 1977, p. 12) The new transition pieces were gradually installed on each Flyer trolley bus, usually as each unit underwent repainting. (Author's Photographs) Plate 45 (Author's Photograph) depicts the rear view of trolley bus Number 216 in the ET paint scheme with the new transition piece in place of the triangular air conditioning housing. The clearance between the bus and the trolley ropes should be noted.

Beginning in 1978, ET began to install two-way radios in all of their rolling stock. (ETAR, 1979, p. 15) While permanent radio sets were installed in the Flyer trolley buses, hand-held portable units were used for the remaining Canadian Car and Foundry trolley buses. (Author's Observations)

Another modification introduced during this period was the installation of gates to open the centre exit doors on the Flyer trolley buses in lieu of the rubber treadle mats. (ETAR, 1979, p. 15) It should be recalled from Chapter VI that the gates were installed because cold weather frequently caused the rubber treadle mats to stick. The centre exit doors, therefore, would either remain open or would not open.

The large height of the side windows on the Flyer trolley buses meant that the signal cords, which were located above the tops of the windows, were beyond the reach of short passengers. In order to enable short passengers to pull the cords, ET installed small lengths of cord on the window frames and on the posts between the windows. These lengths of cord were attached to the signal cords by means of loops and were allowed to drop vertically to a point just above the wainscoating. The lower ends of the cords were looped through small guide rings which were secured to the paneling. The action of pulling on any of the vertical cords caused one of the horizontal signal cords to be pulled as well, and this rang the signal chime. This modification enabled the shortest passenger to operate the signal chime. (Author's Photographs and Observations)

Equipment Disposal, 1977-1980

Following the arrival of the 37 Flyer Industries trolley buses, ET began to remove the remaining Canadian Car and Foundry trolley buses from service. While several units were removed from service during 1977, they were not scrapped immediately because ET believed that they would be required during the Commonwealth Games which were to be held in Edmonton during the summer of 1978. All Canadian Car and Foundry trolley buses were removed from service by November 1978, with the last run being a special charter on November 19. (Author's Photographs) Following their removal from service, ET preserved two model T-44 buses, Numbers 148 and 191, as well as a single T-48A trolley bus, Number 202. (See Appendix I) At this point, ET possessed a trolley bus fleet of only 37 units, the lowest number of such vehicles since 1946. (See Appendix I)

Thirty-seven of the retired Canadian Car and Foundry trolley buses retired during November 1978 were stored outside ET's Westwood garage in operating condition. Edmonton Transit hoped to be able to sell the 37 units to some other city that still operated trolley buses. No such buyers were forthcoming so the City of Edmonton offered them for sale as a lot locally in January 1980. (City of Edmonton Notice of Tender, January 10, 1980) The buses were subsequently sold and were removed from the premises. (Author's Photographs)

New Equipment, 1980-1982

As the Canadian Car and Foundry trolley buses were being retired, the question of retaining trolley bus service arose. Many other Canadian, American and European cities were replacing their trolley bus systems with diesel buses. In view of this development, the City of Edmonton hired a local consulting firm in 1975, Hu Harries and Associates, to undertake an analysis of the future requirements for transit vehicles in Edmonton. The report ascertained that the ideal life of a motorbus was 15 years, while that of a trolley bus was over 25 years. The report concluded that while trolley buses were more expensive to purchase than diesel buses, trolley buses: reduced harmful air pollution, were quieter in operation than diesel buses, lasted longer in operation than motorbuses, and required less maintenance than most motorbuses. An updated version of the report in 1977 recommended the acquisition of a sufficient number of trolley buses in order that there be at least 105 units available for daily service. (Aldermanic Seminar Report, 1978, pp. 3-5)

After considering these reports, the City Council approved the purchase of 100 new trolley buses on July 10, 1979. (Edmonton Journal, July 11, 1979, p. A2) Bids for the trolley buses were solicited from

both North American and off-shore manufacturers. The deadline for the submission of bids was April 1980. The bidding companies included: Elroy Engineering of Australia which could provide either traditional cam control or electronic control; Flyer Industries who could supply rebuilt cam control, or new apparatus supplied by the Japanese Toshiba Company; Brown Boveri Company which would install their electronic apparatus in a GMC model 5307 bus body; Bombardier Industries of Montreal which could supply trolley buses with either cam or electronic control; and the Mack Truck Company in conjunction with the French Renault Company which could supply trolley buses equipped with either cam or electronic control. (Accepted Tenders for Trolley Buses, 1980)

On August 13, the City Council selected the bid of the Brown Boveri Company. (Canadian Brown Boveri Co. Contract for 100 Trolley Buses, August 13, 1980) Although Brown Boveri did not submit the lowest bid in price, their equipment had a well-known favorable reputation. In addition, the GMC 5307 bus was well known to ET personnel since Edmonton operated nearly 400 model T6H-5307 GMC diesel buses. (See Appendix I)

The bodies for these trolley buses were manufactured at GMC's Quebec plant and were similar to the T6H-5307 diesel buses described in Chapter VI. Standee windows as well as operator controlled centre exit doors were provided, however. (See Plate 46) The arrangement of the seating on these trolley buses was similar to the seating arrangement on the last six T-48A trolley buses purchased by the ETS, Numbers 197 through 202. The new trolley buses, therefore, could seat only 42 passengers. It should be noted that since GMC was a subcontractor to Brown Boveri, the normal GMC insignia on the front of the bus was replaced with an insignia which contained the letters "BBC" which was short for

Brown Boveri Company. (Brown Boveri Specifications of Chopper Trolley Bus, 1982) The main motor as well as the control apparatus was supplied by the Swiss Brown Boveri Company. It should be recalled from Chapter IV that the first mercury arc rectifier purchased for the street railway in 1929 was also manufactured by Brown Boveri. It had remained in service until the late 1970's.

A single compound wound motor was mounted longitudinally at the rear of the bus and was controlled by a solid state control unit which was called a "chopper". The motor was more powerful than the older GE 1213 motors that had been supplied with most Edmonton trolley buses in the past. The Brown Boveri trolley bus motor could produce a maximum continuous output of 184 H.P. (137.3 kW). The chopper control is a device that uses a patented arrangement of certain discrete solid state components to control the amount of voltage entering the motor's circuits. The chopper is able to accomplish this without dissipating surplus voltage as heat. The discrete components usually include thyristors, diodes and inductors. (Brown Boveri Specifications, 1982) Thyristors have the property of being able to control the flow of electrons through a circuit in much the same way as a mechanical switch but without any moving parts. The amount of voltage in a circuit containing a thyristor can be controlled by repeatedly turning the thyristor "on" and "off" at a rapid rate by means of a triggering signal applied to its gate. In this manner, the trolley voltage is "chopped" or reduced to low values. The chopper control circuits were located in a steel case which was mounted in the rear compartment of the trolley bus. The operation of the chopper produced some heat. Heat can destroy many solid state components so the case was ventilated by air which was forced through the case by an electrically powered blower. The nature of solid state devices

is such that minimal and infrequent maintenance is required. It should be remembered that solid state components contain no moving parts.

The power pedal was connected to a small variable resistor which controlled voltage in a circuit which was connected to the chopper's control circuits. Dynamic braking blended with air braking was provided with these trolley buses. The required rheostats as well as auxiliary heaters were located in the heating compartment on the bus which normally contained the hot water heaters on the diesel version of the model 5307 bus. (Brown Boveri Specifications, 1982) Trolley voltage was obtained from two roof mounted Ohio Brass trolley bases which were enclosed by a fibreglass cowling. (See Plate 46)

Power for the low voltage lighting was provided by a solid state converter which changed trolley voltage to 12 volts D.C. without the use of any mechanical devices such as motor generators. The converter also charged a small 12 volt battery which kept the lights on in the event of a power loss. The air compressor supplied with these trolley buses was an Atlas-Copco Company model LE 6 unit which was directly coupled to an electric motor. Instead of a reciprocating piston type of compressor, the Atlas-Copco compressor employed a rotating shaft which held several vanes to compress the air. This type of air compressor, in addition to having a higher output than the older type of reciprocating piston compressor, had fewer moving parts which meant that there were fewer parts to service or replace. The electrical apparatus also included an insulation test panel which enabled maintenance crews to test the effectiveness of the various electrical insulators on the trolley bus. This arrangement was similar to the test plug apparatus supplied with the AEC-EE trolley buses of 1939. It should be noted that Brown Boveri had the apparatus to provide either battery maneuvering or

maneuvering by means of a small generator powered by a gasoline engine. Neither of these options were selected by ET. (Brown Boveri Specifications, 1982)

The use of solid state apparatus as well as an air compressor of modern design helped to make these trolley buses extremely efficient and relatively maintenance free.

The final assembly of the trolley buses was done in Edmonton by the contracting firm of Bennett and Emmott. The bus bodies arrived in Edmonton painted white with ET numbering but were not supplied with the ET insignia or the yellow and blue stripes. (Author's Photographs) As each bus was completed in Edmonton, it was tested on the trolley lines and when any problems were corrected, the buses were delivered to ET who applied the remaining portions of the paint scheme. (Author's Photographs)

The 100 Brown Boveri trolley buses were numbered 100 through 199. (See Appendix I) Number 100 arrived in Edmonton during October 1981 and was placed in service during November. The remaining units were placed in service during 1982. (ETAR, 1982, p. 30) Plate 46 (Author's Photograph) shows trolley bus Number 100 in early 1982. The standee windows as well as the steps to the roof should be noted.

The acquisition of the 100 new trolley buses provided ET with the largest number of trolley buses in its history. The new trolley buses were far more efficient than any of the earlier trolley buses. In addition, the use of solid state components instead of mechanical devices such as cam controllers, greatly reduced the amount of maintenance required for these trolley buses. In addition, the use of the GMC 5307 bodies for the new trolley buses meant that many of the parts stocked for body repairs for the GMC diesel buses could also be used for the Brown Boveri

Plate 46. (Author's Photograph) Trolley Bus Number 100

Plate 47. (Author's Photograph) Cut and Cover Construction at North End of Churchill Station, 1977

units. A separate inventory of parts was not required, therefore.

It should be recalled from Chapter IV that the electric power and distribution system for the trolley buses had undergone extensive modernization during the late 1970's and in the early 1980's which helped to increase the efficiency of trolley bus operation. Although the trolley bus has not yet regained its previous status as the mainstay of the transit fleet, the proven longevity of the trolley bus combined with: high energy efficiency compared with motorbuses; infrequent maintenance; no air pollution; quiet operation and fast acceleration have made the trolley bus an inexpensive transit vehicle of the present and the future. The technological development of the trolley bus has made that type of vehicle more efficient and cost effective than the common diesel bus which proves that this system of transportation technology is far from being obsolete. With the decreasing supply of fossil fuels, combined with their rising cost, it would be very foolish to entertain the notion of replacing trolley buses with diesel buses with the idea of decreasing costs.

Chapter VIII

Light Rail Transit Construction

Introduction

The idea of using a rapid transit system in Edmonton that employed high-capacity vehicles travelling on a separate grade from street traffic was first mentioned by ETS Superintendent D. L. MacDonald in early 1960. MacDonald stated,

> It is inconceivable that the city should reinvest in vehicles geared only to surface traffic conditions for the central area of the city far into the future . . . a new system must be developed for the transportation of people within approximately a four-mile [6.4 km] core of the central area of Edmonton, involving people travelling at different levels for safe efficient movement. (Canadian Transportation, February 1960, p. 34)

In spite of numerous studies, reports and increases in transit ridership and City population, no rapid transit system was planned for construction until early 1974 when the Provincial government indicated that it would provide substantial financial aid for public transit improvement. (Edmonton Journal, February 4, 1975, p. 42)

The projected rapid transit line was intended to travel from the central core of Edmonton to the northeast, where new residential development was anticipated. The total length of the initial line was to be approximately 4½ miles (7.2 km), with 1 mile (1.6 km) to be underground near the centre of the City. (ETS Specifications of Northeast Rapid Transit Line, 1974) The rolling stock to be used on this rapid transit line was to consist of light-weight electrically powered vehicles that would travel along steel rails in much the same manner as the obsolete streetcars had done. The grade of the rapid transit line was to be isolated from the streets, however. (Letter to City of Edmonton Finance

Department from Waggonfabrik Uerdingen A. G. [Duewag], October 8, 1974) In most other rapid transit systems in North America, extremely heavy vehicles travelled along the rails. Such vehicles were usually noisy and had to be isolated from inhabited areas because of it. Edmonton's rapid transit system, which was to use light-weight vehicles, was designed to travel on the surface of the ground through inhabited areas in addition to travelling underground. This system of using light-weight vehicles on rails was called "Light Rail Transit", or LRT. (ET Brochure on Edmonton's LRT System, 1978)

It should be understood that while the type of vehicle selected was not widely used in North America, light rail vehicles were in wide use in many European cities on rapid transit systems as well as on street railways. In addition, the basic construction methods of Edmonton's LRT system were modified versions of underground and street railway construction methods first developed during the nineteenth century. (See below)

Underground Construction, 1974-1978

The original underground portion of the LRT system was to travel from the area of 101st Street and Jasper Avenue to a point immediately west of 95th Street north of 105th Avenue. (ETS Specifications of North-east Rapid Transit Line, 1974) Construction began during September 1974 with the excavation of the tunnel entrance near 95th Street. (Author's Photographs, and Edmonton Journal, October 15, 1974, p. 1)

Two basic construction methods were used for the underground portions of the line; cut and cover, and bored circular tunnel. Both construction methods had their origin in nineteenth century London, England. The cut and cover method entailed the removal of earth to a certain depth in order to create a large trench. The trench was then lined with

bricks, concrete or some other building material, and was then covered with a building material that could withstand the weight of street traffic or buildings. The railway tracks were placed in the trench and the movement of passengers was not impeded by street traffic. The first use of the cut and cover method by an urban underground railway was in 1860 with the construction of London's Metropolitan Railway. (Lee, 1975, pp. 7-11) There were two major disadvantages to the cut and cover method. Firstly, it was necessary to remove everything overlying the area of the trench so the method was impractical for use in areas where there were large existing structures. In order to avoid the removal of existing structures, the second disadvantage was encountered. Most underground railways of that era travelled beneath existing roads since there were no structures to remove above the roads. While the construction of the trench took place, however, vehicular traffic along the roads was disrupted which caused extreme inconvenience. (Miller, 1940, pp. 82-98) In addition, such underground railways were frequently longer than necessary because they followed the lay of the streets instead of travelling in a straight line from one point to another beneath structures. In view of these disadvantages, an engineer named James H. Greathead designed a system of underground excavation which did not disturb the overlying earth or structures. Using a patented circular excavating shield and cast iron retaining segments, Greathead constructed the first circular, or tubular, railway tunnel in London. The tunnel was completed in 1870. (Lee, 1974, p. 10)

Although the tubular boring method enabled underground railways to travel beneath buildings, it was more expensive to construct and it did not facilitate the construction of stations which were usually located near the surface. (Miller, 1940, pp. 86-90) Edmonton wished to have

spacious two-level underground stations with the trains travelling through the lower level; and shops and passageways to buildings on the upper level which was to be located immediately below street level. (ETS Specifications of Northeast Rapid Transit Line, 1974) In order to construct a station in this manner, a version of the cut and cover method was selected. The stations, therefore, are located beneath streets rather than beneath structures.

Two underground stations were constructed in this manner: Central Station, which is located beneath Jasper Avenue between a point west of 101st Street and a point east of 100A Street; and Churchill Station, which is located beneath 99th Street between 102nd and 103rd Avenues. (Author's Photographs) In both cases, construction was designed to keep the disruption of street traffic to a minimum. In order to accomplish this, it was decided to remove the road surface only after the side supports for the stations were in place. The sides of the stations were to consist of large concrete support pilings which would support the roof of the stations as well as the upper floor. Drilling for the piles began early in 1975, using large mechanically-driven steel augers which were approximately 42 inches (1 067 mm) in diameter. The holes for the pilings were placed adjacent to each other in long rows. Each row of holes was placed near an edge of the road, with both rows being spaced approximately (18 600 mm) apart. While the usual depth of the holes was 60 feet (18 288 mm), every fifth hole was bored to a depth of between 90 and 99 feet (27 432 - 30 175 mm). In addition, the bottoms of the longer holes were reamed with a special cutting bit which excavated a bell-shaped bottom designed to distribute the weight on the pile over a large area. The shorter piles were designed to support the sides of the trench below the upper floor, while the longer piles were intended

to support a large ledger beam which held the covering of the trench.

After the boring of each hole was complete, a hollow steel casing was lowered into the hole by a crane. A pre-fabricated network of steel reinforcing rods was then lowered into the centre of the casing. Concrete was then poured into the casing until the level came to about 24 feet (7 315 mm) below street level in the case of the shorter piles. The longer holes were filled with concrete until its level was about 7 feet (2 134 mm) below street level. Once the concrete had begun to set, the steel casing was withdrawn from the hole. The surrounding earth provided a form for the setting of concrete piles.

Once all the required piles were installed, the street surface above the piles was excavated until the tops of the longer piles was reached. It should be noted that all utility lines travelling beneath the street were relocated before construction work on the stations began. After the installation of wooden forms and steel reinforcing rods, a concrete "L" or ledger beam was poured along the tops of the longer piles on each side of the street. The ledger beam was approximately 1 550 mm wide at its base and was 2 100 mm in height. The ledger beam was intended to support several pre-cast reinforced concrete beams which would form the roof of the station. In addition to the formation of the ledger beams, interlocking sheet steel panels were driven into the ground along the outside edges of the pilings until their bottoms were just below the tops of the shorter piles. The steel panels not only retained the earth when the area between the two rows of piles was excavated, but they also provided an easy barrier to breach for small tunnels leading to adjacent buildings.

Once the ledger beams were set, the earth between them was excavated to a depth of approximately 24 feet (7 315 mm) to the tops

of the shorter piles. In order to accomplish this operation, all street traffic was diverted since the entire street surface had to be removed. After the excavation was complete along the entire length of the station, pre-stressed concrete beams were placed across the ledger beams in order to form the roof of the station. The beams were coated with grout, a plastic waterproof layer, and a 50 mm thick layer of styrofoam insulation. The new road surface, which consisted of steel reinforced poured concrete, was then formed on top of the beams. The surface of this concrete was crowned in order to cause water to flow away from the centre of the street towards the side gutters. (Brooker Engineering Specifications of LRT Underground Stations, 1974, Edmonton Journal, June 13, 1975, p. 63, and Author's Photographs)

When the roofs were completed over the stations, construction continued beneath without further disruptions to street traffic. The next step of the construction was to smooth the floor of the excavated trench. Large channels were then cut into the floor in order to form molds for support beams for the upper floor. Once this was done, a thin layer of sand was deposited to smooth out any minor imperfections. A steel reinforced concrete floor was then poured. The floor contained several large openings to enable elevators, stairs and escalators to be installed later. The floor not only completed the bottom of the mezzanine level, it also served to hold the tops of the shorter piles in position for the next step, the excavation of approximately 22 feet (6 706 mm) below the bottom of the upper floor to form the track level. (Brooker Engineering Specifications of LRT Underground Stations, 1974, and Edmonton Journal, June 13, 1975, p. 63)

In order to be able to excavate, the earth (spoil) had to be removed from the area. In the case of Central Station, ramps were constructed

on certain side streets to enable large dump trucks and earth moving equipment to enter the station area. A vacant lot adjacent to the end of Churchill Station enabled a ramp to be built without closing any streets. As excavation proceeded, steel beams were placed temporarily between the piles to prevent the possibility of buckling. Once the required depth was reached, a thick steel reinforced concrete slab was poured which formed the track base and which supported the piles. After the completion of the station floor, the ramps were removed and the basic structure of the stations was complete. It should be realized that a short rectangular concrete tunnel was constructed at the northern end of Churchill Station in order to connect that station with the tunnel leading to the surface near 95th Street. (See Plate 47) Plate 47 (Author's Photograph) shows the appearance of the northern end of Churchill Station during April 1977. The following should be noted: piles on either side, ledger beams, roof beams, and the concrete enclosing the track level.

The tunnel leading northeast from Churchill Station was begun during 1974 and was not constructed in the same manner as the two stations. The tunnel was designed to raise the track level to the surface by 95th Street. In addition, this tunnel did not have to pass beneath any large structures so it could be constructed by the cut and cover method. This tunnel consisted of a steel reinforced rectangular concrete enclosure which was installed in an excavated trench. The sides of the trench were supported by temporary steel pilings which were removed when construction of the tunnel was completed. The roof of the tunnel was supported by the sides as well as by a row of square concrete columns which were located along the centre of the tunnel. The tunnel was enlarged near 97th Street in order to accommodate a possible station in the future. The tunnel emerged at the surface immediately west

of 95th Street. A temporary concrete block wall placed at the mouth of the tunnel prevented cold air as well as unauthorized personnel from gaining access to the tunnel. (Author's Photographs)

The cut and cover method could not be used to construct the tunnels joining Churchill and Central Stations because the line of the tunnels was to pass beneath several large buildings. The tubular boring method was used, therefore. Considering the size of the LRT vehicles as well as the required thickness of the tunnel lining, it was decided that the excavated diameter of the tunnels was to be 20 feet 9 inches (6 325 mm). A tunnel was to be provided for each direction of travel between the two stations. The mechanical excavator, known as the "mole", was fabricated by the Lovat Tunnel Equipment Company of Toronto, Ontario to the specifications of the Edmonton Water and Sanitation Department. That Department had the contract for constructing the tunnels because of their extensive experience constructing similar tunnels for Edmonton's sewer system. In addition, the excavator would be used later to construct various large sewers in Edmonton. (Mainstream, February 16, 1977, p. 1 & p. 7)

The excavator consisted of a circular steel ring or tunneling shield which enclosed a large six-bladed cutting wheel that was equipped with numerous carbaloid teeth. An array of hydraulic jacks not only braced the tunneling shield against the circumference of the tunnel, it also served to push the cutting wheel forward a maximum of 5 feet 8 inches (1 727 mm) without moving the tunnel shield forward. Holes near the centre of the cutting wheel channeled the excavated material onto a 46 inch 1 168 mm) wide conveyor belt which, in turn, deposited the material into removal vehicles. A laser beam combined with a computer kept the excavator level and proceeding in the correct direction at all times.

As the excavator advanced, the tunnel was lined with spruce board lagging which was held in place by steel ribs. The lagging and the ribs were installed while the excavator's shield was supporting the recently-excavated portions of the tunnel. This lining prevented the tunnel from collapsing or from allowing the surrounding earth to shift. (Mainstream, February 16, 1977, p. 1 & p. 7)

The excavator was lowered to tunnel level by means of a vertical shaft which was located near the southern end of Churchill Station. The excavator then tunnelled to the eastern end of Central Station, where it was lifted up to street level through another vertical shaft. The excavator was then transported by truck back to the shaft near Churchill Station. Once lowered into the shaft again, the excavator was repositioned so that it could bore another tunnel to Central Station paralleling the first tunnel. While the second tunnel was being bored, the first tunnel was being lined with concrete. In this procedure, crews installed two layers of reinforcing steel along the circumference and the length of the tunnel. One layer of reinforcing was arranged longitudinally, while the second layer was arranged around the circumference. When the reinforcing layers were in place, bolted steel forms approximately 40 feet (12 192 mm) in length were installed inside the tunnel. Small holes were drilled from street level through the wooden lining of the tunnel near the centre of each length of steel form. A lane north of Jasper Avenue was the location for most of the holes. Concrete slurry was then pumped into the holes at pressures up to 2,000 pounds per square inch (13 790 kPa). The pressurized concrete filled all the space between the wooden lining and the bolted steel forms. When the spaces were filled and the concrete had hardened, the steel forms were unbolted and were removed from the tunnel. The tunnel now appeared as a concrete

lined tube with an internal diameter of 17 feet (5 182 mm). The boring and the lining of both tunnels was completed by mid 1977. (Mainstream, February 16, 1977, p. 7, and Author's Observations) Several small tunnels connecting each main tunnel, as well as stairways leading from these interconnecting tunnels to panels in sidewalks located above, were then installed. The interconnecting tunnels and the stairways provided emergency escape routes in the event of a derailment or other serious mishap. The side of each tubular tunnel adjacent to the interconnecting tunnels was equipped with a longitudinal line of hinged steel step material that could be lowered in the event of a derailment or a stuck train. The step material was placed at the same height as the bottoms of the passenger vehicle doors. This arrangement enabled stranded passengers to walk along the emergency walkway to one of the interconnecting tunnels where small steel steps enabled the passenger to descend from the steel step material to the floor of the tunnel. (Mainstream, August 17, 1977, p. 3)

The completion of the tunnels meant that the interiors of the stations as well as track laying could be completed. All interior surfaces of the station were sandblasted to remove any soil, dust and loose particles of concrete that could cause dust problems when the stations were in use. A raised tile-covered concrete platform was installed at track level between the location of each track. A raised platform was necessary since the passenger LRT vehicles would not be equipped with steps and ET did not wish passengers to have to negotiate steps when boarding or leaving vehicles. Stairways between the track and the mezzanine levels were installed as well as an elevator and two escalators in each station. Large ventilation pipes were then installed as well as electrical conduits for the stations' interior lighting. The ventilation piping, the

electrical conduits and the bare station walls and pilings were all covered by prefabricated concrete panels as well as painted corrugated steel panels that were fastened to the pilings. Additional show cases and partitions on the mezzanine level were fabricated using metal studs and painted plasterboard. (Mainstream, August 17, 1977, p. 3, and Photographs in Author's Collection) Dropped ceilings were installed over both the track and the mezzanine levels. The design of the track level was such that no vertical roof supports were placed between the stairways at either end of the platform. (Author's Photographs) This design feature eliminated the possibility of a passenger walking or being pushed into a support pillar. Concrete and steel structures were also erected around each stairway leading from the mezzanine level to the street. Fare collection apparatus was installed on the mezzanine level in front of the stairways and the escalators. Remote controlled television cameras installed on the ceilings at strategic locations on both levels assisted personnel with security surveillance. (Author's Photographs)

The rail selected for the LRT system was a "T-rail" which was similar in cross-section to the ASCE T-rails that were used in the construction of the ERR. (See Chapter III) The rail was much larger, though, weighing 120 pounds per yard (50 kg/m). The rail was manufactured in 39 and 78 foot (11 897 and 23 774 mm) lengths by steel mills in eastern Canada. The rails were sent by rail to the CNR's Transcona Shops in Winnipeg, Manitoba where the lengths were welded together to form 1,400 foot (42 672 mm) lengths. These long lengths of rail, known as "ribbon rail", were transported to Edmonton on special trains. (Mainstream, October 6, 1977, p. 4) Ribbon rail reduced wheel wear because of the lack of rail joints.

Two main methods of track construction were employed in the

underground sections of the line. In the tunnel sections, not including the stations, the rails were secured to raised parallel concrete guideways which were laid along the bottoms of the tunnels. In order to fabricate the guideways along the tubular tunnels, a flat concrete floor had to be poured. Steel reinforcing rods protruding from the floor enabled the concrete guideways to be secured to the floors. (Mainstream, August 17, 1977, p. 3; October 6, 1977, p. 4; and Author's Photographs) Threaded steel studs were inserted in parallel rows into each guideway before the concrete set. The studs were positioned on each guideway so that the correct track gauge, 4 feet 8½ inches (1 435 mm), would be present when the rails were laid. These studs were designed to hold special plates and clips that would secure the rails to the guideway. After the concrete had set, steel plates similar in appearance to traditional tie plates, were placed over the studs. The tie plates had two parallel hollow lugs, each lug being adjacent to a side. Holes in the plates permitted the plates to pass over the studs. The plates were then bolted to the guideway. A small pad of rubber or neoprene was then placed over the plate between the lugs. The rails were then laid. The rubber pads were designed to absorb the sudden shock caused by the passing of a wheel on the rail. The lugs had been arranged so that the holes through them were aligned parallel to the rails.

When the rails were in position, a hydraulically-operated unit passed by each lug and inserted a specially formed loop of spring steel into each lug. The spring steel loops, called "Pandrol clips", were shaped so that both ends of the loop rested against the plate, while the loop pressed tightly down on the top of the rail base. (Mainstream, October 6, 1977, p. 4, and Information from Con-Force Costain Concrete Tie Co., 1977) In this manner, the rails were semi-permanently secured

in the tunnel sections. The lack of track spikes and organic ties meant that infrequent roadbed maintenance was required for these sections. In order to install the ribbon rails in the tunnels, the tunnel entrance near 95th Street had to be opened. It had been planned originally that 95th Street would pass beneath the LRT line by means of an underpass. Budget constraints prevented the construction of the underpass. It was, therefore, realized that the tunnel entrance was too close to 95th Street since the motormen of the LRT vehicles could not see the traffic approaching the 95th Street crossing until the LRT vehicles were at the crossing, by which time it would be too late for an LRT vehicle to make an emergency stop if necessary. In order to improve the visibility of the crossing from the tunnel, approximately 94 feet (28 651 mm) of the roof and the upper two-thirds of the tunnel walls were demolished. (Edmonton Journal, April 19, 1977, p. 16)

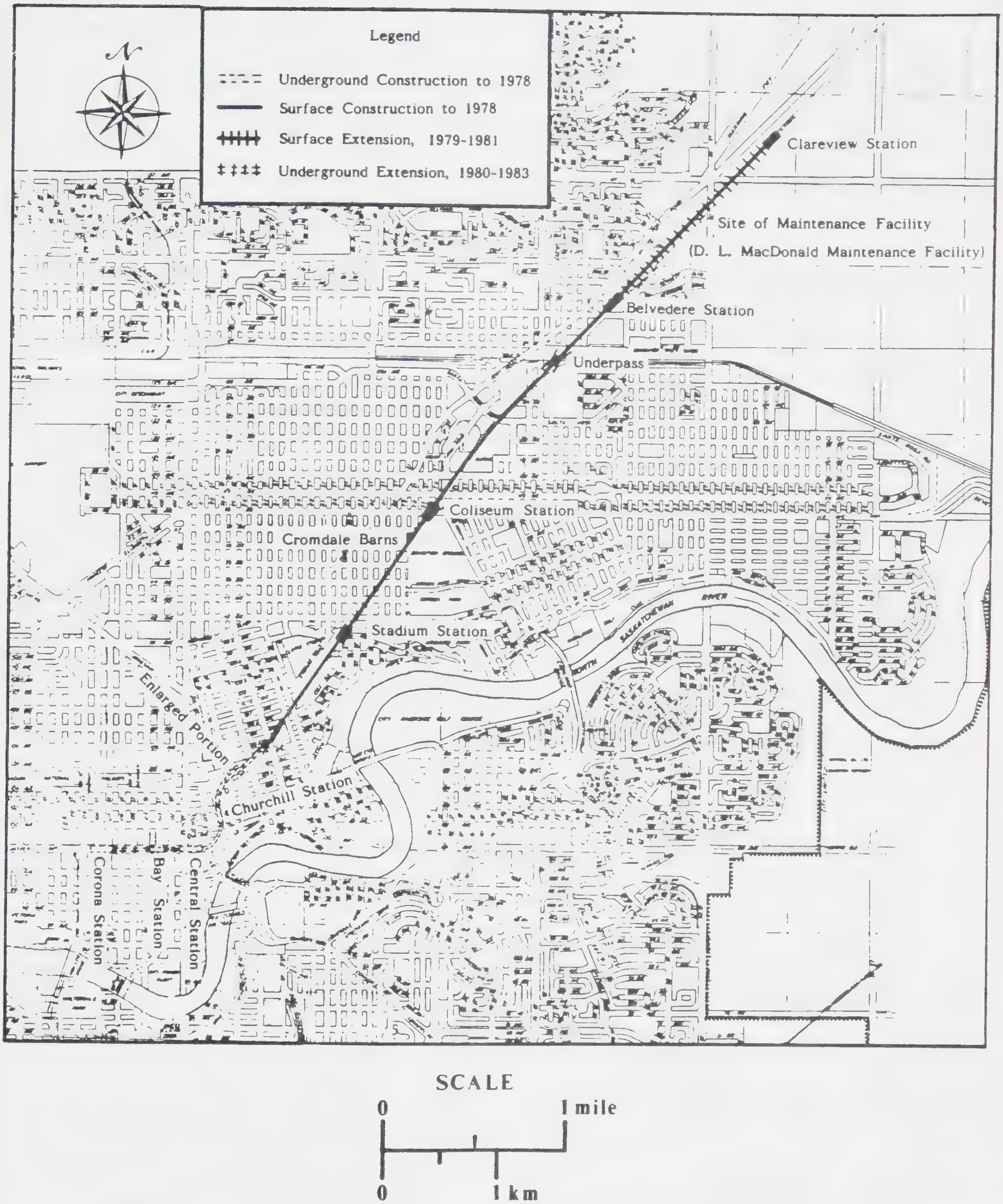
Excessive noise about the stations was a concern so a different method of track laying was adopted for these areas. The type of track construction selected was similar to the temporary track construction used for the ERR. (See Chapter III) The track areas of each station were underlain by thick rubber matting. Treated wooden ties were then placed on top of this matting. The rubber matting was intended to absorb noise and vibrations. The ties were treated with a phenol chloride solution rather than creosote because creosote usually produced an objectionable odor. (Roschlau, 1978, p. 17) Pandrol tie plates were spiked to each tie and the rails were placed in position. Pandrol clips were then installed by machine. Cleaned and crushed gravel ballast was then deposited along the spiked track from modified railroad hopper cars which were owned by the rail contractor, Loram International. A mechanical tamper unit then travelled along the track and raised and tamped the track until

the correct height was attained. The mechanical tamper was able to do this with the aid of a trailing unit which projected two parallel laser beams. When both laser beams struck a target on the tamper unit, the raising and tamping of the track at that location was terminated. The tamper then proceeded and the process continued. (Mainstream, October 6, 1977, p. 4)

A double crossover was installed at the southern end of Churchill Station in order to enable trains to switch tunnels when required. The double crossover was the only piece of special work installed on the underground portion of the line. All of the underground trackwork was completed in the early months of 1978. (Author's Photographs) Map 17 (after Official Map of the City of Edmonton, 1975) shows the extent and the location of the underground construction completed in 1978.

Surface Construction, 1977-1978

The placement of the northeast LRT line facilitated surface track construction since the track was to be located along the centre of the CNR's right of way. (See Map 17) Sufficient room existed along the right of way for a double-track LRT line to be constructed. The construction method used was similar to a commonly used track construction method employed by the mainline railroads of that period. After the subgrade was graded and smoothed, a layer of crushed gravel was deposited to assist with track drainage. Creosote treated wooden ties were then placed in approximate position on top of the gravel. Common tie plates and 50 kg/m ribbon rails were then placed on top of the ties. The rails were set to the correct gauge and were spiked at every fourth or fifth tie. A track laying machine travelling along the roughly spiked track aligned each rail properly and spiked it to each tie. More gravel ballast



MAP 17. LRT CONSTRUCTION, 1974–1983

was then deposited along the tracks and a mechanical tamper unit raised and levelled the track. (Mainstream, October 6, 1977, p. 4, and Author's Photographs) This type of track construction was less expensive than constructing a concrete guideway. In addition, it was believed that the track construction method used would keep the noise levels of LRT trains to a minimum. (ET Descriptive Brochure on the Transit System, 1977)

Several overpass bridges had to be constructed for this portion of the line in order to reduce the large number of level crossings with heavily-used streets. In addition, a large underpass had to be constructed beneath the CNR's main line near 66th Street. (See Map 17) The construction of the underpass was similar to the construction of the tunnel between Churchill Station and 95th Street. A drainage problem was encountered in the area of the underpass. Ground water had not been a problem in the construction of the underground section of the line since the water table lay several feet (m) below the level of the tunnels. The area around the underpass was somewhat swampy, however, and water tended to collect near the bottom of the underpass. In order to avoid the possibility of flooding, large electrically driven pumps were installed near the underpass. The pumps transferred any accumulation of water away from the underpass to adjacent storm sewers. The track construction through the underpass and its approaches was identical to the construction found in the tunnels, concrete guideways with Pandrol clips securing the rails. (Mainstream, October 6, 1977, p. 4, and Photographs in Author's Collection)

Special work on the surface portion included a right-hand crossover immediately east of 95th Street and another such crossover south of Coliseum Station. To enable the LRT vehicles to switch tracks at the northeast terminus (Belvedere Station), a left-hand crossover was installed

immediately south of the station. The left-hand crossover south of Coliseum Station enabled LRT vehicles to reach the refurbished Cromdale car barns where the bus section constructed in 1946 had been converted for use by LRT vehicles. An interchange with the CNR was also installed at that location. (Author's Photographs) The Cromdale car barns, now referred to as the "Cromdale barns", could once again be used to store and to service railed vehicles after a 25 year hiatus. It should be noted that all switches, including those located underground, were normally operated by remote-controlled electric motors which were connected to the switches by means of rods and levers. Snow and ice were not allowed to accumulate near the switches. Special hot air switch heaters powered by propane were used to melt snow and ice from around the switches. Shaped steel heating ducts directed hot air from the switch heater's furnace to the area around the switch tongues and frogs. (Author's Photographs) Switch heaters were not required for the underground switches. The installation of the surface track was completed by the end of 1977. (Mainstream, October 6, 1977, p. 4) The extent of the surface track may be seen on Map 17.

The station buildings along the surface portion of the line consisted of concrete and steel structures which used corrugated steel and acrylic sheets for roof covering material. Access to the platforms was provided by underground tunnels which led to an area beneath the platform from entrances located to the side of the track area. Stairways, escalators and a single elevator enabled passengers to reach the platform from the fare collection area. The only exception to this design of station was Belvedere Station. This station was constructed in such a way that it did not cost as much as the other surface stations. Belvedere Station was located next to only one secondary rail line so it was felt that

underground passageways were unnecessary. Treated wooden piles were used to support the concrete station platform instead of concrete piles that had been used in the construction of the other surface stations. Portable steel and acrylic shelters were placed on the platform instead of a more elaborate and expensive permanent enclosure. (Author's Photographs)

Signal System, 1977-1978

In order to avoid collisions between vehicles and other operational safety hazards, an elaborate signal system was installed on the line. The system was designed specifically for the line by the Siemens Company. (Author's Photographs) Each track was divided into several blocks which had block signals located near each end. Each block contained a low voltage electric circuit through the rails. Each block circuit was isolated from adjacent blocks. Each block was isolated from the next by means of special insulated bolted rail joints which were installed by cutting the rails at the points where the blocks began and ended. (See also Chapter IV for additional information)

The operation of the LRT system was arranged in a similar manner to double-track street railway operation. Outbound traffic used the southern track while inbound traffic used the northern track. The block signals, which were two lens, two color target signals, could display either a green light or a red light. The signals were mounted on short lengths of steel tubing which were held in place on concrete pedestals along the surface portions. In the tunnels, the signals were secured to the sides with bolts and steel brackets. The lamps of each signal were arranged vertically, with the red lamp being uppermost. Each signal was also given a number to assist with location. The number of the

signal was displayed on a metal sheet which was affixed below the green lamp. (Author's Photographs) The signals were controlled either by a programmed computer or by a manual switchboard. Both the computer and the switchboard were located in the control centre which was located on the mezzanine level of Churchill Station. The control centre also housed the video monitors for the surveillance cameras as well as the radio apparatus for communicating with the buses and the LRT vehicles. (ETAR, 1979, p. 15) A panel marked with the track layout and lamps for each block showed the relative position of each train on the line. In addition to this apparatus, sensors and strong electromagnets were located in steel cases bolted to the ties between the rails near each end of each block. The sensors detected the presence of a train in addition to its speed. If a block signal displayed a red lamp or the train was travelling at excessive speed, an electromagnet within the case caused a contactor on the LRT vehicle to open which cut power to the motors, applied the brakes, and activated an alarm in the motorman's cab. This safety system reduced the probability of two LRT vehicles colliding and also reduced the likelihood of derailments caused by excessive speed. In addition to regulating train movement, the signal system blocks also activated the crossing gates at each level crossing. Some block signals were also equipped with two vertical yellow lights which were located below the green lamp. The yellow lights would flash alternately when certain conditions were met. The flashing yellow lamps warned LRT motormen that heavy vehicular traffic had recently been sensed at the crossing and the motorman should exercise extreme caution since there could be one or more motorists trying to use the crossing after the gates had descended. Sensitive panels installed in the surface of the road on either side of the crossing provided the controlling computer with

information about the numbers of vehicles traversing the crossing within a specific time interval. If the computer determined that a heavy traffic flow existed, the flashing signal would be activated. (Author's Photographs and Observations)

Wiring for the signal system was placed in conduits that were secured to the sides of the tunnels in the underground portions of the line. Along the surface portions, the conduits were buried in trenches dug along the outside edges of the tracks. (Author's Photographs) In addition to the signal system, enclosed telephones were located along the side of the tracks at varying intervals. These telephones, designed to be used for emergencies only, were connected to the control centre. (Photographs in Author's Collection)

The construction of the initial part of the northeast LRT line was completed in early 1978 and free public rides were offered during April 18 through April 20. The official opening of the system took place on April 22, 1978. (Edmonton Journal, April 17, 1978, p. H1)

Surface Construction, 1979-1981

During 1979, the City Council approved the construction of a 2.2 km extension of the LRT line northeast from Belvedere Station to a new station to be called "Clareview Station". (See Map 17) Construction of the extension was begun before the end of 1979. (ETAR, 1979, p. 5)

The construction methods used for the extension were generally the same as the methods used for the initial surface portions of the LRT. Swampy areas located along the line of the extension required large amounts of earth fill in order to raise the subgrade above the water level. Special work on the extension included a right-hand crossover

north of Belvedere Station, another right-hand crossover south of 137th Avenue and a left-hand crossover north of 137th Avenue. In addition, a temporary spur track was installed from the eastern track into the area of the site of the new LRT maintenance facility. (Author's Photographs and Observations) The spur track enabled special work trains to transport earth to the site from excavations beneath Jasper Avenue. (Author's Photographs)

The station at Clareview was constructed in a similar fashion to Belvedere Station. A substantial concrete and painted corrugated steel entrance and exit building was also placed at the northeast corner of the platform. This building housed the fare collection apparatus and led onto a bus loading area. (Author's Photographs)

Construction of the extension was completed in early 1981 and regular service on the extension began on April 26, 1981. (Edmonton Journal, April 27, 1981, p. B2) Map 17 (after Official Map of the City of Edmonton, 1975) shows the location of the Clareview extension as well as the site of the new LRT maintenance facility.

Underground Construction, 1980-1983

During 1979, the City Council gave its approval to the design and the construction plans of a new underground extension to the LRT system that was to travel from Central Station west beneath Jasper Avenue to a station located between 107th and 108th Streets. (ETAR, 1979, p. 5) Construction of the new 0.9 km underground extension began with the building of the stations in 1980. (Jasper Avenue Transitions, June 1983) Two stations were planned and both were to be located beneath Jasper Avenue. A short station was to be located between 103rd and 104th Streets and was to be called "Bay Station". The second station,

located at the terminus of the line, was called "Corona Station". Corona Station was longer since it began between 106th and 107th Streets and ended halfway between 108th and 109th Streets. (Jasper Avenue Transitions, June 1983)

The construction methods used for the stations and the connecting tubular tunnels were basically the same methods that had been used in the construction of Central and Churchill Stations and the tubular tunnels connecting them together. (Author's Photographs) Spoil removal from the tunnel bores was facilitated by the use of specially constructed differential dump cars which were hauled by an electric locomotive to the spur track at the site of the new maintenance facility. The spoil was deposited at that location and was used as fill to raise the ground level above the water table. (Author's Photographs) The freight equipment will be discussed in the next chapter.

The track construction in the extension was similar to the construction used in the building of the original tunnels for the LRT. The wooden ties, rubber matting and gravel ballast were dispensed with for the stations, however. Concrete guideways with Pandrol clips were used in the station areas instead. Excessive noise with this track construction method did not appear to be a problem. (Author's Photographs and Observations)

The interiors of the stations at track level were finished with plated and polished metal strips which were attached to an elliptical steel framework that extended along both sides as well as the ceiling. This arrangement increased the amount of reflected light in these stations so that they did not appear as dingy as Central and Churchill Stations. The tiles covering the platforms were arranged in decorative patterns. In addition to fluorescent light fixtures, the new stations contained large

vertical chandeliers which improved the esthetic appearance of the stations as well as improving the lighting levels. (Author's Photographs)

The construction of the new underground extension was completed by the end of May 1983 and regular service began on June 25, 1983. (Jasper Avenue Transitions, June 1983) Future underground and surface construction is planned but further extensions will be built when supplementary funding is provided by the Provincial Government.

Chapter IX

LRT Rolling Stock

Introduction

The previous chapter described the construction of an underground and a surface rail line which was intended to be used by high-capacity, electrically-powered vehicles. Unlike the defunct street railway, the tracks on the surface portion of the line were isolated from other vehicular traffic except at points where the line crossed roads (level crossings). (See Chapter VIII) The vehicles, therefore, could be much longer in length than traditional streetcars and buses since increased length would not affect the movement of other vehicles. The LRT system had been designed for platform loading so the vehicles would not have to be equipped with steps which were difficult to manage by some passengers that had used streetcars, buses and trolley buses in the past.

Although Edmonton had terminated its street railway service in 1951, other Canadian and American cities had retained their systems and by the early 1970's were converting portions of their systems to LRT operation. Much of the rolling stock on these systems was obsolete or in need of replacement. In response to the need for new equipment, several North American manufacturers began to produce light-weight vehicles that: had a large passenger capacity, were the same basic shape as a streetcar, used traditional arrangements of electrical propulsion and control apparatus, and could negotiate the tight radius curves that were common on street railways. In order to be able to negotiate tight curves, these vehicles were usually manufactured in two main sections which were joined in the middle through a hinged coupling called an

"articulation". North American manufacturers included: Boeing-Vertol in the United States, and the Ontario Transportation Development Corporation in Canada. (Newsletter, July/August, 1973, pp. 122-123, and March/April 1974, pp. 52-53)

High-capacity articulated streetcars and LRT vehicles had been manufactured and used in several European cities for many years. Rome, Italy, for example, received its first articulated streetcar in 1942. (Ogliari & Sapi, 1974, pp. 1298-1299) European manufacturers had, therefore, been producing high-capacity railed vehicles for many years by the time North American manufacturers began to produce such products in the early 1970's. The City of Edmonton, nevertheless, solicited bids for their LRT vehicles from domestic manufacturers as well as from off-shore manufacturers.

Passenger Equipment, 1977

After the plans for Edmonton's first LRT line were approved in 1974, bids were solicited for the supply of a number of high-capacity, electrically-powered vehicles which were suitable for both the underground and the surface portions of the line.

The North American builders had recently received orders for LRT vehicles from other cities in the United States but no vehicles had been constructed by the end of 1974. (Newsletter, July/August, 1973, pp. 122-123) No North American LRT vehicle, therefore, had been proven in service. The most promising bid came from the West German builder Waggonfabrik Uerdingen or "Duewag" as it was popularly known. Duewag proposed to supply a number of three truck, articulated vehicles which would be similar in appearance and construction to their type U2 vehicles that had been recently supplied to the West German City of Frankfurt.

(Letter to the City of Edmonton Finance Department from Duewag, September 20, 1974) The vehicles were to be arranged for double end operation, a similar arrangement to the first streetcars ordered for the ERR in 1908. The motive power was to be provided by two large D.C. motors with series-parallel control operated by an electronically-governed camshaft controller system. The electrical apparatus was to be supplied by the German Siemens Company which had supplied other electrical apparatus to the City in the past. (Letter to City of Edmonton Finance Department from Duewag, October 8, 1974)

Duewag had been producing articulated LRT vehicles for many years and that company had a favorable reputation in many European cities. An additional attraction to the Duewag proposal was the possibility of having some of the assembly work undertaken in Edmonton. If this were done, the import duty on the vehicles could be reduced. (Letter to City of Edmonton Finance Department from Duewag, September 20, 1974) Considering these points, the City ordered 14 LRT vehicles from Duewag in November 1974. (See Appendix I)

The new LRT cars for Edmonton were given the designation RTE1 since they were to contain several differences that would distinguish them from the U2 type vehicles on which they were based. (Letter to Rapid Transit Project from Siemens, January 5, 1975) Each type RTE1 car consisted of two long body sections that were joined at one end over an articulation which was supported by an unmotorized truck. Each body section contained a control cab and was supported near the cab end by a motorized truck. Each body section was approximately 1 100 mm in length and both body sections were constructed in a similar fashion. (Duewag Specifications of Rapid Transit Car, 1978, p. 5) It should be noted that since these vehicles were fabricated, for the most part, in

West Germany, the Systême International d'Unités (SI) measurements were used exclusively. Unlike the defunct streetcars (but like most modern trolley and motor buses), each LRT body section was fabricated as an integral unit. All the underframing consisted of light-weight rolled and hollow steel sections that were arc welded together. The bottom of the underframing was strengthened near the ends for the installation of couplers. Small bulkheads were installed at each end in order to prevent any twisting of the sides. The bulkheads were small, however, and they did not interfere with the movement of passengers within the interiors of the cars. Except for the cab ends, the body sections were sheathed with sheet steel. Wood and canvas were no longer considered to be suitable building materials for such vehicles. The side panels consisted of steel sheets that were 1.5 mm thick, which were welded to the side framing. Above the windows and on the roof, sheet steel of 1.25 mm thickness was used since these areas were usually high enough to avoid any blows. The cab end of each body section was fabricated of fibreglass. The fibreglass unit was attached to the steel framing of the car section by means of screws. The fibreglass unit was designed for easy replacement and contributed to reducing the total weight of the car. (Duewag Specifications, 1974, p. 2)

The flooring in each section consisted of 16 mm thick waterproof plywood which was secured to the underframing with screws. The sides of each body section were framed for four large windows, two folding door sets, and a small rectangular window in each side of the motorman's cab. The interior sheathing above the windows as well as the ceiling panels consisted of white painted fibreglass panels. The panels were joined together by means of "H" section extruded aluminum moldings which were painted to match the color of the panels. The ceiling panels

were designed to support lighting fixtures and contained numerous small slots which permitted air within the car to enter ducts inside the ceiling, which directed the air to roof-mounted exhaust fans. The wainscoating on these cars consisted of carpet-covered melamine panels. In addition, the back of the motorman's cab, facing the interior of the vehicle which contained a single outwards opening door on the right-hand side and a fixed rectangular window on the left, was also sheathed with melamine. (Duewag Specifications, p. 6)

The spaces between the interior and the exterior sheathing were insulated. A 15 mm layer of fibreglass insulation was installed between the roof and the ceiling, while the insides of the exterior panels were coated with two layers of a bitumen compound and a single 2.5 mm thick layer of "Schallschluck 301 DC", which was a polymerized material that absorbed noise and minor vibrations. It should be noted that the underside of the body sections also received a 2 mm thick application of the sound absorbing compound. (Duewag Specifications, p. 3)

The door leading to the motorman's cab contained a small fixed rectangular window which was similar to the window installed on the left-hand side of the partition separating the cab from the rest of the interior. The door to the cab was normally kept closed by means of a spring latch. A handle on the side of the door facing the interior of the cab enabled the motorman to close and open the door easily from the cab. The latch could be opened from the interior of the car by means of a special square wrench or key which was supplied to each motorman. (Author's Observations) This arrangement provided some security to the cab area and to the motormen.

The interior of the motorman's cab housed the necessary apparatus required to control the various systems of the vehicle. The ceiling of

the cab also contained two small air vents as well as an access panel to the destination roller sign and its illuminating lamp. (Duewag Specifications, p. 6) The front of each cab contained two angled windshield sections and a single elliptical glass panel above the windshield sections which covered a single roller sign. The windshield sections were angled to reduce reflections on the interior surfaces of the windshield sections at night. The windshield panes consisted of tinted thermic insulated safety glass which contained an electric heating grid on the interior surface. (Duewag Specifications, p. 7) The wire grid was connected to a power supply and was intended to heat the windshield sufficiently in cold weather to remove any condensate or frost. Large pull-down shades were installed in the cab behind each windshield section to provide the motorman with protection against direct sunlight and glare. It was mentioned previously that a small rectangular window was located in each side of the cab. These windows not only permitted the motorman to see to the sides, but the upper halves of both windows could be slid down to provide the motorman with additional air. (Duewag Specifications, p. 7)

The large side windows were sealed in place with rubberized molding along the edges. The upper quarter of the windows, which were framed with extruded aluminum, were hinged along the bottoms and could be pulled open to allow air to enter the interior of the car directly. This design of window prevented passengers from sticking appendages outside. Each doorway was 1 300 mm wide by 1 900 mm high. Two Duewag fibreglass folding door halves were installed in each doorway. The doors were operated by an electro-mechanical drive mechanism which was located in a compartment in the interior of the car located above the doorway. The power for the door mechanisms was controlled by a switch

on the motorman's control panel, while the opening and the closing of the doors was controlled by the passengers. A stanchion mounted in the centre of each doorway on the inside of the car held a push button switch in addition to a small steel enclosure above it which contained an acrylic panel. When the operator activated the door circuits, an incandescent lamp inside the enclosure was activated. The light illuminated a sign on the inside of the acrylic panel which read "doors open" in addition to a small arrow which pointed down to the push button switch. By pressing the switch, the passenger closed a circuit to the door opening motor and both door halves opened. A push button was also mounted next to the door on the outside of the car to enable passengers to enter the car. The centre doors on each car section had two push button switches on the exterior, one near each side of the doorway. These exterior push button switches did not have an illuminated panel above them to indicate when power to the door opening circuit was present. Instead, the button was illuminated inside by a small incandescent bulb when the door opening circuit was energized. A time delay feature in the door mechanism kept the doors open for approximately 3 seconds after they were fully open. When the doors were either in the open or the closed position, solenoid operated pins kept the doors in that position. The solenoids were located in the mechanism compartment above the doorway. It should be noted that this compartment also contained two handles which could be turned in the case of an emergency. This action released the solenoid locking pins which enabled the doors to be opened manually.

Each door half was equipped with a sensitive edge that would cause the door to reopen if the edge struck an object while closing. Unlike the sensitive edge strips installed on the early trolley buses in Edmonton,

the new sensitive edge strips did not contain wires. In order to eliminate the adjustments necessary with wire sensitive edge strips, a rubber strip was used which contained a sealed hollow capillary tube running longitudinally. Pressure on the capillary tube compressed the air inside it. A sensor switch mounted near the top of the strip reacted to the increased pressure by closing a circuit which reversed the power to the door motor, thus reopening the door. (Duewag Specifications, p. 4) In addition, each door half was also equipped with a photo-electric cell which received light from a small lamp mounted on the stanchion in the centre of the doorway, the same stanchion which held the push button switch. The photo-electric cell was located near the bottom of the door in order that the shortest of passengers would be protected. The photo-electric cell functioned in a similar manner to the sensitive edges, by reversing the power to the door motor if the light beam was interrupted. It should be noted that at each stop the doors would open only if a passenger either inside or outside the car pressed one of the push button switches. The push button switch only opened the particular door immediately next to the switch. (Duewag Specifications, p. 4) This arrangement prevented excessive heat loss from the interiors of the cars. An additional door feature enabled the motorman to activate the door circuits on the doors located immediately behind the cab. (Duewag Specifications, p. 4) This feature enabled the car to unload and to pick up personnel at small platforms located near maintenance facilities.

The floors of the interior were covered with a tight-weave carpet material which was treated with compounds to resist moisture and soiling. The floor areas around each door, however, were covered with a rubber matting which had regularly spaced circular protrusions on its surface. The matting was intended to provide a slip-free surface for passengers

entering or leaving the car. (Author's Observations) Except for the stanchions in the centre of each doorway, Duewag did not install the remaining stanchions or any seating. The seating, which was to consist of several cross seats arranged in compartment fashion, one cross seat facing another, was to be fabricated in Edmonton. (Edmonton Journal, April 13, 1977, p. 51) This seating arrangement was well suited for double end operation of the LRT cars since some of the seats would always be facing in the direction of travel. The stanchions not installed were supplied, however. The stanchions were designed to fit into aluminum holders that were secured to the framing above the ceiling. The bases of most of the stanchions were designed to fit into similar aluminum holders which were secured to the tops of the seats. With this arrangement, legs underneath the seats were not required since the ends of the seats adjacent to the aisle would be supported by stanchions. The stanchions were composed of steel tubing which was covered with a plastic coating referred to as "Kautex". This coating not only provided a sanitary surface on the stanchion, it also insulated the stanchion from any electric currents. Smaller vertical grab handles were supplied for both interior walls of the articulation. Grab handles were also supplied for the partition walls separating the interior of the car from the cab. (Duewag Specifications, 1974, p. 7)

One of the two body sections held the current collection apparatus which was installed on the roof near the rear of the section (the end opposite the cab). The current collector consisted of a half pantograph which was raised by means of springs and was lowered by an electric motor and gear arrangement. A description of the current collector and its operation were included in Chapter IV. In order for the half pantograph to be insulated from the roof and in order for it not to

damage the roof at that location, the pantograph was mounted on boards which were fixed to the roof. These boards were similar in appearance to the trolley boards installed on the Edmonton trolley buses. (Duewag Specifications, p. 3, and Author's Observations)

The body section that was fitted with the current collector was designated the "A end" of the car, while the other section was known as the "B end". (Duewag Specifications, p. 3) The open ends of both sections were semi-permanently connected to an articulation. The articulation rested on a single unpowered truck and consisted of an inverted "U" shaped frame or yoke which was bolted to a floating bolster which rested on springs supported by the truck sideframes. A circular turntable in four parts was also attached to the bolster. Steel members attached to each body section were secured by large pins to the underside of the turntable. The turntable not only permitted each body section to turn independently of the other, it also permitted vertical movement of each body section as well as the articulation. This arrangement reduced the stresses between the body sections and the articulation and reduced the likelihood of derailments. A roof-mounted guide rod assembly connected the roof of each section with the top of the articulation. This guide rod as well as the turntable kept the two body sections spaced a constant distance apart. The articulation frame, which was sheathed with fibreglass, was necessarily smaller than the sides of both body sections in order to permit unobstructed lateral and vertical movement of the three car components. In order to keep dust and the elements from entering the interior of the car through the articulation, flexible rubber sections were attached to the bulkheads of each body section and to the articulation frame. The rubber sections were hidden from view on the exterior since the articulation frame extended inside the

body sections a few millimetres. Carpet covered fibreglass panels installed on the inside of the articulation frame prevented the rubber sections from being seen from the interior of the car. (Duewag Specifications, p. 3)

Each RTE1 type LRT car assembly was supported by three two-axled Duewag trucks. Both the powered and the unpowered trucks were similar in appearance and both were fabricated of steel. The sides of the Duewag trucks were somewhat similar in appearance to the Bemis type 45 trucks which were used on some ERR streetcars but there was no further similarity between the Duewag trucks and any streetcar truck used on the ERR. The Duewag trucks consisted of two sideframes and two truck bolsters which were fabricated as a single integral unit, thus eliminating many individual frame parts and their requisite fasteners. The end of each axle was supported by a roller bearing journal box. Instead of the sideframes resting on coiled springs placed on top of the journal boxes, primary suspension was provided by heavy rubber blocks which were attached to the sides of the journal boxes. Both the sides of the journal boxes and the corresponding slots in the sideframes were tapered so that the rubber blocks were tightly wedged in the sideframes. The blocks were resilient enough to permit some vertical journal box movement but were not soft enough to allow uncontrolled axle movement. A rod placed through the sideframe beneath the journal box prevented the journal box from dropping out from the sideframe slot. (Duewag Specifications of Rapid Transit Car, 1978, p. 5) The use of rubber blocks instead of springs meant that noise as well as vertical movements would be dampened.

The wheels on each axle were significantly different from the wheels used on the ERR streetcars. It should be recalled from Chapter V that

one of the major complaints made against streetcars was the excessive noise made by the wheels travelling along the rails. Newer streetcars introduced during the late 1930's employed a system whereby a flanged steel tire was attached through a layer or layers of stiff rubber to a steel hub which was attached to the axle. (Thompson, 1940, pp. 50-148) This type of composite wheel was used on the Duewag trucks installed on Edmonton's 14 RTE1 LRT cars. The diameter of the wheels when new was 720 mm, a much smaller diameter than any wheel used on the ERR. (Siemens Specifications of Electrical Equipment, 1975, p. 2)

Each axle on both the powered and the unpowered trucks contained a large ventilated brake disc. A brake caliper was provided for each brake disc and was bolted to a lug welded to one of the truck bolsters. (Author's Photographs) The brake pads in the calipers were forced against the brake disc by means of strong coiled springs. The brake pads were normally held away from the brake disc by means of large holding electromagnets. The pads were withdrawn from the disc by means of an electric resetting motor and gear assembly. It should be noted that these spring operated disc brakes comprised only part of the vehicle's braking system. (Siemens Specifications, p. 12)

Both sideframes of each truck held magnetic track brakes which were bolted to the bottoms of the sideframes and which were positioned over each rail. Each track brake consisted of a large electromagnet which was enclosed in a steel housing. When energized, each track brake could exert a force of approximately 55 kN on the rail. The six magnetic track brakes on each car were used for emergency braking only. (Siemens Specifications, p. 3) It should be understood that magnetic track brakes were not a new innovation. This type of brake apparatus had been used on many types of streetcars since the early 1920's. (Dover, 1929, pp.

371-373)

The trucks were attached to the body sections and to the articulation by means of a floating steel bolster and a large diameter ball bearing race. Two steel coiled springs mounted on the top of each sideframe near the centre supported the steel bolster. The bolster, in turn, held a large diameter steel ring which held several bearing balls in small slots. This ring comprised the bottom of the bearing race. Another ring was bolted to the underframe of the car at the desired location of the truck. The car was lowered onto the truck and the rings interlocked. Hydraulic shock absorbers were then connected between the truck sideframes and the floating bolster to further dampen any vibrations and shocks. (Duewag Specifications, 1974, pp. 9-14) This truck mounting arrangement eliminated much of the turning friction and the lateral motion encountered by streetcars which were attached to their trucks by means of kingpins and side bearings. (See Chapter V)

Each Duewag truck had steel semi-circular mud guards installed over the upper half of each wheel. These guards, which were bolted to the sideframes, prevented moisture, sand and mud on the rails from being thrown up into the truck or the motor. The exterior of each truck was also surrounded by an arrangement of narrow steel bars which were bolted to the sideframes and which served as a lifeguard (fender). (Duewag Specifications of Rapid Transit Car, 1978, p. 4) This arrangement was practically identical to that provided for the Brill 21-E truck installed on ERR streetcar Number 7 in 1908. (See Chapter V) That arrangement was found to be woefully inadequate since that lifeguard could and did enable a person to be crushed and killed by the streetcar. It should be recalled from Chapter V that the ERR's fleet of streetcars was re-equipped with a better form of lifeguard (the Hudson-Bowring type) as

the result of the inadequacy of the original apparatus.

The LRT cars were equipped with gravity feed sanders which were controlled by solenoid operated valves. Sand was distributed in front of the leading axle and in front of the second to last axle, as seen in the direction of travel. The purpose of the sand was to increase wheel adhesion during certain accelerating and braking maneuvers. The sand boxes, which were fabricated of steel plate, contained an inner liner of wood to reduce corrosion inside the box. The sand boxes were placed under seats in the interior and were located above each powered truck. The sanding tubes leading to the rails were attached to the truck lifeguard and were joined to the sand box outlet pipe by means of a length of rubber hose. The sand boxes were usually filled from hatches which were located on the exterior of the car below the windows. The sand boxes could also be filled from the inside of the car if necessary. (Duewag Specifications, 1974, p. 8)

Although single LRT cars could operate without difficulty, their electrical and control systems were designed so that up to five cars could be coupled together and operated from either one of the end-most cabs. This arrangement was referred to as "multiple unit operation" or MU. (Siemens Specifications, 1975, p. 1) In order to join the cars together, a reliable coupling system had to be used. The Duewag cars were equipped with a Scharfenberg coupler which was centered at each end. Heavy steel piping was attached to a pivot which was secured to a strengthened portion of the underframing. The coupler head, which was mounted on a smaller diameter steel rod, was slid into the piping. A system of flanges and coiled springs kept the coupler head attached to the pipe stalk while allowing the head to move longitudinally when it was struck.

The Scharfenberg coupler head was rectangular and contained a tetrahedral-shaped protrusion on the left-hand side and a similarly-shaped depression on the right-hand side. In coupling operations, the cars were moved together so that the protrusions on each coupler entered the depressions of the other. When the protrusions had entered the depressions, a small lever near the end of each protrusion was depressed. This action released a locking pin in the protrusion which prevented the protrusion from being pulled out from the other coupler. A switch inside the motorman's cab enabled the cars to be electrically uncoupled. The switch closed a circuit to an electric motor which drew the locking pin into the protrusion. In order to be able to operate all coupled cars from one cab, the electrical control circuits had to be connected together as well. This operation occurred simultaneously with the coupling of the cars. A Faberg lug type electrical connector was mounted on the top of each coupler head. The lugs of each connector were normally protected by a sheet steel cover. As each coupler came together, levers deflected by this action caused the connector covers to pivot upwards out of the way. The connectors were joined as the couplers were fully connected. (Duewag Specifications, p. 8) In this manner, the individual LRT cars could be coupled together and operated from one control position.

It has been mentioned previously that Siemens provided most of the electrical equipment for these vehicles. Each LRT car was powered by two Siemens box frame, series wound, self-ventilated motors which could each produce a maximum continuous output of 150 kW. (Siemens Specifications, p. 4) Each motor was mounted longitudinally on its respective truck. The trucks nearest the cab end of each body section were powered. In order to power both axles of the truck, a heavy-duty

bevel gear hypoid differential was installed on each axle. This was accomplished by the installation of a hollow pipe along a short distance of the axle. The pipe, which was an integral part of the differential, contained a flange at each end which had evenly-spaced square notches cut along the circumference. These flanges were designed to be connected to similar flanges which were secured to the axle. Each pair of flanges was designed to interleave the square teeth along the circumference. Small spaces existed between each tooth, however. These spaces were filled with stiff rubber wedges. This arrangement served several purposes. Firstly, the flanges transmitted torque from the differential pipe to the axle. Secondly, the rubber wedges absorbed most of the noise and the vibrations produced by the differential gears and by the motor. In this manner, such noise and vibrations were isolated from the truck frame and the body of the LRT car. Thirdly, the flange arrangement facilitated the replacement of the axle or the differential without having to dismantle the differential while it was attached to the axle.

Each differential contained a large crown or "bull" gear which was bolted to a flange attached to the differential pipe. A hypoid pinion gear was held at right angles to the crown gear by the differential housing. The housing enclosed the gears and also contained the necessary lubricating oil. The pinion gear shaft, at the end facing the motor, was hollow and contained internal splines. The differential housing also contained a large flange near the end of the pinion gear shaft. This flange was designed to hold one end of the motor. It should be noted that the differential on the opposite axle was arranged so that the crown and the pinion gears were arranged backwards in relation to the differential on the opposite axle. With this arrangement, the rotation of the motor would revolve both axles in the same direction. Each end of the

motor contained a short length of splined shaft as well as eight studs which were designed to secure each end of the motor to a differential. (Siemens Specifications, 1978, p. 5) This arrangement enabled the motor to be securely mounted to each differential which, in turn, transmitted torque to both axles of the truck. Power to the motor windings and the armature was provided by several insulated cables which could be disconnected from the body of the LRT car. In order to prevent electrical damage to the various bearings on the trucks, the return current was fed directly to the axles from flexible wipers which rested against the axles. (Siemens Specifications, 1974)

The motor control equipment on these LRT cars was a combination of: the series-parallel control that had been used on the ERR streetcars; the camshaft controller and contactor system that was used on some of the older ETS trolley buses; and solid state monitoring and governing devices which were similar to some of the apparatus found on the Brown Boveri trolley buses. Fully electronic "chopper" control was not used on these LRT cars.

The cabs of each type RTE1 LRT car each contained a key-locked direction and operation control drum and a combination control and braking handle which was called a "command transmitter". The handles for both units were located at the top of a cabinet to the left of the operator. This layout was similar to that found on the ERR streetcars for the controller. The movement of the direction and operation control drum energized the command transmitter handle. In addition, the control drum selected the direction of travel and recovery from operational faults, such as releasing the dead-man feature too long or attempting to run the car through a red signal. (Siemens Specifications, 1975, p. 6)

The handle of the command transmitter was connected by small

gears to a low-voltage magnetic field potentiometer (variable resistor). This type of potentiometer does not contain any parts which slide across each other, thus reducing the frequency of service for the unit. In the neutral position, the handle of the command transmitter was positioned vertically. Pushing the handle forward provided increasing voltage to a small motor and to electronic monitoring circuits which were connected to the controller's camshaft. Pulling the handle back from the neutral position not only caused the controller shaft to be returned to the "off" position, but the action caused the controller's camshaft to be rotated to the braking positions. This arrangment eliminated any mechanical linkage or high voltage connection between the controller and the command transmitter. (Siemens Specifications, p. 6) The controller was located in a compartment on the lower left-hand side of the A section of the body. The accelerating and braking rheostats were divided into two groups, each group being located in a steel cabinet mounted on the under-frame beneath the floor of each body section. Electric blowers connected to each cabinet provided air to cool the rheostats. (Siemens Specifications, p. 6)

The operation of the camshaft controller was similar to the operation of the type of camshaft controllers installed on the Mack, Pullman-Standard and Canadian Car and Foundry trolley buses. Instead of using a separate bank of contactors, the Siemens controller incorporated the contactors in the controller's frame. Since there were two motors on each LRT car, series-parallel control could be used. The Siemens controller employed 11 series and 9 parallel steps or notches. Additional motor speed was achieved in the last two parallel steps by the reduction of the voltage (excitation) to the motors' field coils. This arrangement enabled the LRT cars to attain a maximum speed of 80 km/h. (Siemens

Specifications, pp. 5-9) The command transmitter did not entirely control the speed at which acceleration and braking took place. An electronic device referred to as a "Simatic running and braking regulator" monitored: wheel slip on the rails, the jerking of the car body during accelerating and in most braking, and the position of the controller's camshaft. The Simatic unit was located inside the A body section in a steel cabinet placed beneath one of the seats. The Simatic unit regulated the speed at which the controller's camshaft was rotated in order to provide the smoothest and the most efficient accelerating and braking speed. It should be noted that if the unit sensed wheel slippage, for example, the solenoids on the sand boxes would be energized and sand would be deposited on the rails. In addition, the speed of acceleration would be retarded until normal wheel adhesion was recovered. (Siemens Specifications, pp. 8-13)

Dynamic braking was the primary braking system on these LRT cars, the amount of braking being determined by the position of the command transmitter and the various circuits of the Simatic unit. When the dynamic braking had slowed the car to a speed of approximately 5 km/h, the Simatic unit cut the power to the electromagnets holding the calipers of the spring actuated disc brakes open. The disc brakes, therefore, were used to bring the car to a complete stop. (Siemens Specifications, p. 10) The only time that the disc brakes were not used during braking was during an emergency brake application. In such a maneuver, all six electromagnetic track brakes were activated. In addition, the controller was immediately returned to the "off" position and the line breakers were opened. It should be noted that features such as the jerk detection circuits were removed from operation in order to enable the car to be stopped in the shortest distance possible. (Siemens

Specifications, p. 12) It should be realized by this point that these LRT cars did not contain any sort of air brake equipment, nor did they use any apparatus that required compressed air. This arrangement eliminated elaborate and costly compressed air systems. The braking systems described previously were thought to be satisfactory. Air brakes, therefore, were considered obsolete and unnecessary.

Several operational safety features were included with these vehicles. In the event of a car inadvertently uncoupling while in operation, the spring actuated disc brakes on the uncoupled car were immediately activated. This action would bring the car to a safe stop in a short time. Each cab on each LRT car contained a dead-man feature which was designed to stop the LRT car if, for any reason, the motorman became incapacitated and could no longer control the car. Either a foot switch located in the cab or a hand switch located on the right-hand side of the motorman's indicator console had to be depressed at all times when the car was in motion. If no switch was depressed for more than approximately two seconds, maximum dynamic braking was instigated. This braking could be cancelled only if the motorman depressed the hand switch and moved the handle of the direction and operation control drum. (Siemens Specifications, pp. 10-12) It was mentioned in Chapter VIII that the signal system on the LRT line contained track-mounted electromagnets which would cause power to the motors to be cut if an LRT car attempted to pass a red signal. The car would be stopped because the electromagnet between the rails would cause the line breakers on the car to open and would send a signal to the Simatic unit to apply full dynamic braking. (Siemens Specifications, p. 10)

Trolley voltage was not suitable for all the electrical apparatus on these LRT cars. Voltage of this type and magnitude was inappropriate

for: the electronic control equipment, the door operating motors, the headlights and other exterior lamps, and the interior lighting. A low voltage power supply was required. In order to reduce the cost of the apparatus necessary to produce the low voltage, each LRT car was equipped with a motor generator which was manufactured by the West German firm, Lech Motoren. The motor of the unit, which was powered by trolley voltage, was rated at 6 kW maximum output. (Siemens Specifications, 1978, p. 5) The generator produced two regulated output voltages, 220 volts A.C. and 22.5 volts A.C., both at a frequency of 100 Hz. (Siemens Specifications, 1974, p. 11) The 220 volt supply was used to power the interior fluorescent lamps as well as several roof-mounted ventilator fans. The 22.5 volt A.C. supply was used to heat the windshield heating grids. The power was also directed through a solid state rectifier which produced an output of 24 volts D.C. This voltage was used to charge a lead acid storage battery. The 24 volt D.C. system powered: the control equipment, the head and tail lights, the door motors, the disc brake resetting motors, the holding electromagnets, the magnetic track brakes, and other electrical accessories. (Siemens Specifications, 1974, p. 11) It is perplexing to understand why 220 volts was selected as the voltage for the interior lamps. Although 220 volts A.C. was common household current in many European cities, that voltage was not widely used in Canada. In addition, many motor and trolley buses in the ET fleet used fluorescent tubes as well. The supply voltages for the tubes on those buses was 110 volts A.C. produced by a transistorized unit. (See Chapter VI) It should be noted that 100 volts A.C. was also the common household voltage in Edmonton.

Although motor generator sets were used by Edmonton trolley buses in the past, their use was becoming rare because of the predominant

use of solid state inverters and rectifiers which contained no moving parts. It should be recalled that the Brown Boveri trolley buses had been equipped with a solid state inverter and rectifier unit. (See Chapter VII) The major disadvantage of a motor generator was that it contained several moving parts in addition to several carbon brushes that required periodic replacement. Solid state units, however, did not contain any moving parts and did not require periodic maintenance. Solid state units usually had a much longer maintenance free period than mechanical motor generators. It is possible that the motor generators on the LRT cars will be replaced by solid state units when it is discovered that the units have increased maintenance and labor costs.

The cab end of each body section contained a control console for the various auxiliary circuits in the car. The console, which contained an array of switches and indicator lamps, was installed directly in front of the motorman's seat and was designed to be at a convenient height when the motorman was seated. The console was fabricated of painted steel and was angled upwards beyond the centre. Some of the indicator lamps and switches, therefore, were on the flat portion of the console while other switches and lamps were located on the angled portion. The console contained a speedometer and a battery state of charge meter as well as four rotary switches. These switches controlled: the windshield wiper motors, the cab defroster/heater fan, the side selector switch for the doors, and the operation of the public address system. In addition, the console contained several rectangular illuminated push button switches and similarly shaped indicator lamps. The switches controlled the: raising and the lowering of the pantograph, opening and closing of the line breaker, manual operation of the sanders, headlights, activation of the door opening switches, warning horn at that end of the car, operation

of the coupler at that end of the car. A special series of switches located at the extreme right-hand side of the console enabled the motorman to bypass a red signal in certain emergencies. The indicator lamps revealed any faults in the various electrical and mechanical systems in the car. It is important to note that the control console was designed by Siemens in conjunction with the City of Edmonton. Except for the rotary switches, the function of each switch and indicator lamp was provided by pictograms which were etched and colored onto the top of each switch and indicator lamp cover. (Siemens Specifications, 1978, p. 4) The use of pictograms instead of labels made the control console appear uncluttered and easily understood.

It was mentioned previously that the motor generator unit provided the power for both the interior and the exterior lighting. The interior lighting consisted of two parallel strips of fluorescent tubes which were installed on the ceiling of each body section. Each strip contained seven fluorescent tubes. The tubes were covered by an opaque acrylic light diffuser. The wiring of these circuits was designed so that in the event of a failure of the motor generator, four fluorescent tubes in each car section would remain illuminated by a solid state converter which was powered by the 24 volt D.C. battery. The interior of the motorman's cabs were illuminated by two small ceiling spot lamps which were powered by the 24 volt D.C. supply. (Duewag Specifications, 1974, p. 7, and Siemens Specifications, 1974, p. 14) In addition to the door push button bulbs, the exterior lighting included: two automobile-type sealed dual beam headlights which were installed at each end of each car; four small red combination tail lights and reflectors which were installed at both ends of each car next to the headlights; and amber colored operation lamps which were installed on the sides of the car near each door nearest

the cab ends. The operation lamps were illuminated when the car was stopped and all control drums were set to the "off" position, but all major power systems were still active. The lamps were also illuminated during an operational fault. These lamps could indicate potential problems to observing personnel. (Siemens Specifications, 1974, p. 14) Other electrical apparatus included a public address system. This transistorized unit enabled a motorman or a tape recording to make announcements to the passengers inside the car. A microphone, mounted on a flexible shaft which was attached behind the control console, enabled the motorman to use the system. The motorman could also address passengers standing on the platforms, since each car was equipped with roof-mounted loud speakers which could be activated by one of the rotary switches on the control console. The amplifying equipment was located in the interior of the B body section in a steel cabinet which was located underneath one of the seats. The interior speakers for the system were located inside compartments in the bulkheads of each body section near the articulation. (Siemens Specifications, 1974, p. 17, and 1978, p. 2)

A small electric horn was installed at each end of the LRT cars. The horn, which was located underneath the floor of the cab near the coupler, was activated by a push button switch located on the control console. (Siemens Specifications, 1974, p. 18) The horn produced a high-pitch tone and was easily confused with an automobile horn. Most pedestrians and motorists did not readily associate the sound of that horn with an LRT car. (Author's Observations) Each windshield section was equipped with an electrically powered vertical wiper. The wipers could be set for continuous or intermittent operation. (Siemens Specifications, 1974, p. 18)

The heating of the interior during cold weather was accomplished

in a similar manner to the heating of the ET trolley buses. A duct leading from each rheostat compartment to floor ducts in each body section enabled the heated air from the rheostat cabinets to enter the interiors. Supplementary heat was provided by two 16 kW auxiliary heating elements which were located in the rheostat compartments. A solenoid controlled damper could direct the heated air to the interior ducts or it could direct the air to exterior exhaust vents. The operation of the solenoid dampers as well as the auxiliary heaters were controlled by thermostats located in the interior of the car. The heating system incorporated a safety feature. In the event of a power interruption to the solenoid, the solenoid would return to its rest position, which caused the damper to direct the heated air to the outside. In this way, the interior could not be inadvertently overheated. (Siemens Specifications, pp. 13-14) Ventilation through the interior was provided by roof mounted exhaust fans which were connected to the ceiling ventilator ducts. The fan motors were powered by the 220 volt A.C. supply. (Siemens Specifications, p. 15) The fresh air intakes consisted of louver vents which were located in the exterior sheathing near the bottom of the body. (Duewag Specifications, 1974, p. 8)

In addition to the heated window panes, each motorman's cab was equipped with a 3 kW electric heater which was controlled by a thermostat. The heater, which operated from trolley voltage, also served as an auxiliary defroster for the windshields. (Siemens Specifications, p. 13) Two small ceiling-mounted ventilation fans in each cab provided air circulation inside the cab. The fans were each powered by a motor which operated from the 24 volt D.C. supply. (Siemens Specifications, p. 15)

Each LRT car was also equipped with an external rear view mirror

on each side of each cab. The mirrors, which could be pivoted, enabled the motorman to observe the boarding and the unloading of the cars under his or her control. (Duewag Specifications, 1974, pp. 9-10)

The exteriors of the LRT cars were painted white at the factory and were coated with a protective wax to prevent damage from salt water spray on their sea voyage to Canada. Each car was shipped dis- assembled, the trucks and the articulations being shipped in sealed containers. (Edmonton Journal, April 6, 1977, p. 1951) The only exception to the painting was the first unit which also received ET's blue and yellow stripes as well as the ET insignia. This unit was fully assembled in Germany and was tested on a street railway before it was dismantled and shipped to Edmonton. (Duewag Specifications, 1978, p. 1)

The first units arrived in Edmonton during March 1977. Upon their arrival, the cars were transported to the Cromdale barns where they underwent the final fitting by Siemens Canada Limited. The cars were then painted and numbered. (Mainstream, March 30, 1977, p. 1)

The seating for the LRT cars was manufactured in Edmonton by two companies: Oxford Machine and Welding which fabricated the sheet steel seat frames; and Apex Auto Upholstery which fabricated the seat backs and cushions. (Edmonton Journal, April 13, 1977, p. 51) One end of each seat was supported by a steel ledger which was attached to the side of the car, while the other end of the seat was supported by a stanchion. Cloth upholstery with decorative stripes was used to finish the seats. Each car was also equipped with a safety belt mechanism adjacent to the seats nearest the articulation. The purpose of the safety belt was to secure wheelchairs, which enabled wheelchair bound individuals to ride the LRT cars safely. Each LRT car had a seating capacity of 64 passengers and could also accommodate 97 standees. (Duewag Speci-

fications, 1978, p. 1, and Author's Photographs) The cab end of each car was fitted with a two-way radio set which was mounted to the right of the control console. The radio enabled the motorman to communicate with a dispatcher located at the Churchill Control Centre. (Author's Photographs; see also Chapter VI)

Each LRT car was finished in ET's standard colors. The cars were numbered 1001 through 1014. (See Appendix I) Most of the new cars were operational by the end of 1977 and were used for training purposes in early 1978. (Edmonton Journal, January 11, 1978, p. 1) When the LRT system was placed in regular operation in April 1978, two coupled LRT cars comprised each regular train, with three car trains being used during some peak periods. (Author's Photographs) Plate 48 (Author's Photograph) shows the appearance of LRT car Number 1004 coupled with another car during 1978. The following should be noted: A and B body sections, articulation, coupler, current collector, doors, headlights and tail lights, mirrors and the trucks.

Service Equipment, 1977

It had been decided by ET that a service vehicle was required to move any disabled LRT cars in the event of an accident or a power failure. A vehicle was required that was large, powerful and did not require electricity for its power. Edmonton Transit employed the Canron Railgroup Company of the United States to construct a unit suitable for this purpose. What Canron produced was a large four-wheeled dump truck-like vehicle that could travel along roads as well as on rails. The vehicle consisted of a welded steel frame which held a GMC model 453 diesel engine, an Allison four-wheel drive transmission, an operator's cab, and a small dump box. The frame also contained two sets of small

Plate 48. (Author's Photograph) LRT Passenger Car Number 1004

Plate 49. (Author's Photograph) Locomotive Number 2001 and Differential Dump Car

flanged steel wheels which were hydraulically raised and lowered. The flanged wheels permitted the unit to operate on the track, while the tires permitted the vehicle to travel along roads. To enable the unit to move LRT cars without damaging itself or the car, a Scharfenberg coupler was installed at the rear of the frame in addition to a spring loaded bumper bar above it. (Author's Photographs) The dump box enabled the vehicle to be used for small amounts of ballasting. The front of the frame was designed to hold snow removal apparatus such as curved blades; and such apparatus was applied to the unit in January 1979. (ETAR, 1979, p. 10)

The unit, which was called the "Kal-Trac heavy-duty land/rail vehicle", was painted a bright yellow and was numbered 3850. (Author's Photographs)

Passenger Equipment, 1979

By late 1978, ET was planning the extension of the LRT line from Belvedere Station to Clareview. (See Chapter VIII) In order to provide the same frequency of service along the entire line, three additional LRT cars were required. During this time, the City of Calgary had ordered a number of Duewag type RTE1 vehicles in order to provide service on its new LRT line in that city. In order to obtain the three required units quickly, Edmonton added its order for three cars onto Calgary's order in early 1979. The three additional LRT cars arrived in Edmonton during August. They were completed and painted in the Cromdale barns and were placed in service although the new Clareview extension was not complete. (ETAR, 1979, p. 11)

The three new cars were numbered 1015 through 1017 and contained some minor differences from cars 1001 through 1014. In addition to

a warning horn, each of the new cars was equipped with an electric alarm gong at each end. Each gong was mounted below the floor of a cab and was activated by a switch. Unlike the streetcar gongs which were struck once each time the foot plunger was depressed, the alarm gongs were rung continuously as long as the switch was depressed. (Author's Photographs and Observations) It was believed that the unusual sound of the alarm gong would cause unwary pedestrians and motorists to notice the imminent approach of an LRT car.

The design of the openable portion of the large side windows was altered slightly. It should be recalled that the windows of the first 14 Edmonton LRT cars had the upper portion of the windows framed in extruded aluminum. This arrangement proved unsatisfactory since the framing could easily be distorted if the window was violently pulled open. The result of this treatment was drafts entering the car during cold weather. This problem was solved on the new cars by eliminating the aluminum framing and increasing the size of the rubber molding around the window. The frameless upper portion of each window, when closed, rested against the rubber molding which was flexible enough to seal the window and keep most drafts out of the interior. (Author's Observations)

The operation of the first 14 cars had revealed a problem that ET had not experienced since the time of the British Daimler-Duple motor buses some five years earlier. It should be recalled that one of the most serious drawbacks of the British buses was the scarcity of compatible domestic repair parts which were less expensive than imported parts. (See Chapter VI) The headlights supplied with the first 14 LRT cars, although sealed beam lamps, were larger in diameter than the standard North American sealed beam headlight. This condition meant that ET had to import replacement headlights from Europe at great cost. In

order to eliminate this practice, ET specified that smaller headlight holes were to be cut into the fibreglass end panels on each car. This modification enabled ET to use the more common and less expensive North American sealed beam headlights. (Information from ET, and Author's Observations)

Equipment Modifications, 1979-1980

The original 14 LRT cars underwent several modifications during this period to make them safer and more efficient to operate. The previous section mentioned that these LRT cars were not able to use North American headlights because of their smaller diameter. In order to eliminate this condition, ET began to modify the headlight mounting holes on each of Numbers 1001 through 1014. As each car entered the shop for maintenance, the old headlights were removed and the existing holes were made smaller by the addition of fibreglass strips and polyester resin. After the fibreglass had hardened, it was smoothed and painted. The smaller North American headlights could then be installed. (Information from ET)

Each car was also equipped with electric alarm gongs to make them compatible with cars Numbers 1015 through 1017. (Author's Photographs) In order to alleviate some of the problems experienced with the aluminum-framed window sections, ET installed small brackets on the frames to the side of the windows. These brackets limited the amount that each window could be opened. This feature reduced the likelihood of the window frames being distorted which, in turn, would reduce the drafts entering the car. (Information from ET and Author's Observations)

It had been discovered that the windows in the partition separating the cab and the interior of the car had allowed too much light to enter

the cab when the car was travelling in the tunnel sections or travelling at night. The light caused distracting reflections to appear on the inside of the windshield which interfered with the motorman's ability to see. To eliminate this problem, a dark tinted transparent tape was applied to the window. This tape enabled the passengers, in daylight, to see into the cab and out the windshield. When travelling in the dark, however, the tape served to reduce the amount of light entering the cab so that reflections were not produced on the inside of the windshield. (Author's Observations)

Freight and Service Equipment, 1980-1981

The start of the new underground extension of the LRT line beneath Jasper Avenue meant that some means of spoil (undesired excavated earth) removal had to be devised. It should be recalled from Chapter VIII that large ramps on side streets were constructed to enable dump trucks to be loaded with spoil from the excavation site. This arrangement, although satisfactory, caused an inconvenient disruption of normal traffic on that particular street and on streets in the immediate area. In order to keep the disruption of road traffic to a minimum, it was decided to remove the spoil by using special cars which would travel along the existing LRT line. In addition, the proposed site of the new LRT maintenance facility required large amounts of fill so disposal of the spoil would not be a problem. In order to transport the spoil along the LRT line, suitable cars were required as well as an electric locomotive to pull them. Edmonton Transit decided that it could purchase a used electric locomotive inexpensively and believed that it could design suitable freight cars for hauling the spoil. In 1979, ET was able to purchase a surplus electric locomotive from the British Columbia Hydro Rail

Company in Vancouver, B. C. (ETAR, 1979, p. 22)

The unit, which had been built in 1912 originally for the Oregon Electric Railway, had been used in Vancouver for freight operations between 1946 and 1970 when it was retired and placed in outdoor storage. (ETAR, p. 22, and Photographs in Author's Collection)

The locomotive had been manufactured by the American Locomotive Company (Alco) and consisted of a heavy riveted steel frame which supported a large cab in the centre and sloping steel cabinets on both ends of the cab. These cabinets, which sloped from the cab to the ends of the frame, housed some of the rheostats and some of the air brake apparatus as well as the sand bins. This type of locomotive was generally referred to as a "centre cab locomotive". The unit was equipped with two heavy-duty two axle Alco trucks which each held two outside hung General Electric motors. (Author's Observations)

The electrical equipment was supplied by the General Electric Company and functioned in a similar fashion to the series-parallel control found on the ERR streetcars of that era. The locomotive was also equipped with Westinghouse air brakes and a Westinghouse air compressor. In addition, the unit had the valves and piping necessary to operate the air brake apparatus on most pieces of railroad rolling stock. An air horn as well as a brass locomotive swing bell comprised the locomotive's warning devices. Current collection had been by means of trolley poles. (Author's Photographs)

The locomotive required extensive overhauling upon its arrival in Edmonton. In addition to being out of service for several years, some of the air brake parts protruded from the sides of the frame sufficiently to prevent the locomotive from clearing the station platforms. Also, the trolley pole current collector could not be used on the LRT catenary.

Upon its arrival in 1979, the locomotive was mechanically and cosmetically refurbished. Mechanical activities included: overhauling the electrical and the air brake apparatus, relocating the brake cylinder to enable the unit to clear the station platforms, installation of a half-pantograph current collector on the roof of the cab, and the installation of new headlights. In addition, an electrically powered hydraulic pump was installed on the locomotive. That unit was to be used to operate cylinders on the spoil cars. (Mainstream, November 1980, p. 7)

The locomotive was also repainted on the interior and the exterior after the surfaces had most vestiges of old paint removed. The exterior of the locomotive was painted in the standard ET colors. The locomotive was numbered 2001 and was placed in service during 1980. Plate 49 (Author's Photograph) shows the appearance of centre cab locomotive Number 2001 in July 1980. The roof mounted pantograph as well as the air horn and headlights should be noted.

The rolling stock pulled by the locomotive consisted of four flat cars and ten differential dump cars. (See Appendix I) All of this rolling stock was fabricated using the frames of surplus work equipment purchased from the Northern Alberta Railways (NAR; now part of CNR). (Mainstream, November 1980, p. 7) The first three units produced from the work equipment were flat cars. The flat cars consisted of the frame, trucks, couplers and air brake apparatus of the old work cars, with a wooden deck mounted on top of the frame. In addition, steel stake pockets were fabricated and were welded to the sides of the frames. The frames of the flat cars were painted an olive green which was similar to Pantone ink shade 574C. (Comparisons by Author with Pantone Matching System Book, 1980) The truck sideframes were also painted this shade of green. The three flat cars were numbered 2101 through 2103 and

were used to transport various building and construction materials to the site of the underground extension. (Author's Photographs; see also Appendix I)

A special flat car with a depressed centre was fabricated from the frame of another work car by the Edmonton firm KML Custom Fabricators Limited. (Informaltion from Edmonton Transit) The construction of this flat car also required a quantity of new steel beams. The frame of this unit was welded together and was equipped with a wooden deck. This flat car was painted in a similar fashion to the regular flat cars and was numbered 2201. (Author's Photographs) Number 2201 was designed primarily to transport the mechanical excavator (the mole) to and from the construction site. The depressed centre on the flat car enabled the excavator to clear the ceiling of the tunnels. (Mainstream, Novlember 1980, p. 7)

The remaining rolling stock consisted of ten differential dump cars that were designed by ET and which used the frames and the trucks of surplus tank cars. The dump container for each car was fabricated by KML Custom Fabricators to ET's specifications. The rectangular dump containers were fabricated of sheet steel and hollow square steel sections which were welded together. Each dump container was fabricated so that it did not possess any internal dividers such as those found on the ERR's differential dump car. (See Chapter III) The capacity of each container was approximately 30 cubic yards (27 m^3). (Information from Edmonton Transit) The container was mounted on the frame of the car so that it was hinged longitudinally along the centre. The sides of the container were also hinged at the top and were normally kept closed by a system of levers. Hydraulic cylinders on both sides of the frame beneath the container permitted the container to be tipped to either

side in order to facilitate unloading. Flexible hydraulic hoses with quick disconnect fittings enabled the hydraulic system of each dump car to be connected to the locomotive's hydraulic hoses. All but one of the dump cars was equipped with steel platforms at both ends. The platforms held the operating valves for the hydraulic cylinders as well as the hand brake wheels for each car. A short frame prevented one of the dump cars from being fitted with end platforms. The hydraulic control valves were located at the ends of the car near the couplers. (Author's Photographs; see also Appendix I)

The dump cars were painted in the olive green paint scheme and were numbered 2301 through 2310. (Author's Photographs) Most of the freight equipment was completed during 1980. (See Appendix I) When complete, each dump car was placed in service hauling spoil from beneath Jasper Avenue to the site of the new LRT maintenance facility. Plate 49 (Author's Photograph) depicts one of the differential dump cars coupled behind the locomotive during July 1980.

Passenger Equipment, 1981-1983

The construction of the Jasper Avenue extension as well as the prospect of the construction of further extensions prompted ET to order 20 additional LRT cars from Duewag/Siemens. (ETAR, 1982, p. 23) These cars were identical in external appearance to the 17 type RTE1 cars in service in Edmonton. The 20 new cars contained some mechanical improvements, however. The number of heating elements for the cabs and the interior of the cars was increased so that the cars would be sufficiently warm in the coldest Edmonton weather. A more comfortable seat was installed in each cab. In addition, the door to each cab was changed from a swing door to a sliding door. (ETAR, p. 23) The swing

door was dispensed with because that type of door, which was installed on Numbers 1001 through 1017, occasionally struck a departing passenger when the motorman was attempting to leave the cab after the car arrived at a terminal and many passengers were attempting to leave the car. (Author's Observations) Other improvements included: metal scuff panels to protect the hot air ducts from foot damage, ceiling-mounted radio sets in the cabs, and a manual release mechanism for the disc brake calipers that could be operated from inside the car. This feature was particularly useful if one or more brake calipers became stuck. In the past, if a caliper could not be reset, the caliper could be reset manually only from underneath the car. This was a difficult, time consuming and dangerous maneuver. The new manual release mechanism reduced the safety hazard of releasing stuck brake calipers and shortened the time necessary to complete the task.

Three of the new cars arrived in late 1982, with the remainder arriving during 1983. (See Appendix I) Final assembly and painting of the cars was done at the Cromdale barns. (ETAR, 1982, p. 23) The cars were painted in the same manner as the LRT cars in service and were numbered 1018 through 1037. (Author's Photographs; see also Appendix I)

Further extensions of the LRT system will require the purchase of additional passenger cars. Whether the Duewag/Siemens built RTE1 vehicles will continue to be acquired will depend upon cost, availability, and the suitability of domestic-built LRT vehicles.

Chapter X

Conclusions, Observations and Recommendations

Conclusions and Observations

This report has outlined and described the various transportation technologies that have been implemented in Edmonton for public use, the reasons for their initial use, and a description and reasons for the changes from one type of technology to another. The report covered this development from the beginnings of the Edmonton Radial Railway through the early 1980's. To the author's knowledge, no similar technological history has been done in the past at any Canadian university.

The design of this report and the implemented research methods were primarily intended to produce a chronicle of the historical technical developments of the municipally-owned public transportation system in Edmonton. The flexibility and the logical design of this report was intended to make it a viable method to use in other subject areas.

The importance of prevalent and changing socio-economic conditions upon the technological development of the transit system has been described. The effects of wars, economic recessions and the rise of the automobile have all had profound effects upon the development of transportation technology. The transportation of freight by the ERR, for example, was an essential and a desired service by large companies before the widespread use of large motor trucks and all-weather streets that could support them. Before the popularity of motor trucks, the ERR purchased and constructed special tracks and rolling stock that were specifically designed for freight transportation purposes. The increasing numbers of paved streets and the arrival of large motor trucks that could

reach customers without the need of tracks eventually eliminated the freight business of the ERR. Trucks proved to be more economical to operate than the street railway mainly because of their flexibility. The rise of the automobile also made some pieces of service rolling stock obsolete. Sprinkler cars, which had been used to flush horse manure to the sides of paved streets with streetcar tracks, were not required after the demise of the horse as the prevalent means of personal or commercial transportation. Automobiles also made the placement of the street railway tracks in the centre of the street obsolete. The tracks were usually placed in the centre of the street to assist with track drainage, since the surface of most streets was crowned. In order for individuals to leave or to reach the streetcars, they had to cross at least one lane of traffic. This maneuver was hazardous and tended to disrupt the flow of automobile traffic. Motor and trolley buses could load and unload passengers at the sides of the roads, which was safer and more convenient for the passengers.

The crowding of existing streets by traffic was a major factor in the decision to construct a rapid transit system. By employing techniques of underground construction and the isolation of surface grades from street traffic wherever possible, Edmonton was able to upgrade its transportation system in part so that it could move large numbers of people great distances quickly, without hindrance from traffic.

From the beginnings of a municipally-owned public transportation system in Edmonton, the main criterion for selecting particular technologies has been cost. While some may believe this criterion to be beneficial to the taxpayer since capital costs were kept low, in the long term both the taxpayer and the transportation system have suffered because of high yearly maintenance costs that have frequently resulted

in higher costs than more expensive types of construction and equipment. In the first months of track construction on the ERR in 1907 and 1908, heavy rails were securely installed on a substantial concrete roadbed. The extreme cost of this construction method combined with a paucity of funds led the city to replace that construction method with one which used lighter rail and a so-called "temporary" roadbed. Although temporary track was much cheaper to construct than permanent track, the temporary track required constant maintenance and repair and was usually rougher riding. These factors contributed to poor service, rapid wear of equipment, and high maintenance costs. In the short term, temporary track was cheaper than permanent track but over a protracted period, temporary track was more expensive and, therefore, was poor economy.

Cost and immediate availability have been the main criteria for the selection of rolling stock throughout the history of the transportation system in Edmonton. These criteria have been shown to be unsatisfactory since many items of rolling stock have been obtained in this manner which were not well suited to Edmonton's climate and, therefore, have required expensive modifications to make them serviceable. The St. Louis streetcars, for example, were purchased because they could be delivered within a short time. Those streetcars were found to be too cold during winter no matter what modifications were made to them. Although they were obtained quickly, their inadequacies were experienced for many years. Against the recommendation of the consulting engineers Wilson and Bunnell, the Street Railway Department purchased British trolley buses that were less expensive than American built units. The British trolley buses proved to be difficult to operate and to maintain in Edmonton. Although modifications were made to these buses, their life span was much shorter than subsequent trolley buses that were

purchased from American builders. By not following the recommendations of consultants who had experience with trolley bus operation, unsuitable equipment was obtained.

The same experience was repeated during the 1960's with the purchase of the Japanese buses and the British Daimler-Duple buses. These buses, although cheaper than domestic buses, had not operated in such harsh climates and were found to be unsuitable. The foreign vehicles were so unreliable that used domestic equipment that the City had purchased for use during peak hours were found to operate more satisfactorily. Although most of the problems were corrected with the foreign buses, revenue was lost for the time they were out of service.

The German LRT cars, which were selected primarily because of availability, are somewhat expensive to maintain because some of their replacement parts are not readily available in Canada.

It has been shown in the report that changes and modifications to existing technology have frequently come about because of inadequacies of the equipment purchased and because of new technological developments. It should be noted that the electric heaters supplied with the first streetcars were frequently found to be unsatisfactory in providing sufficient heat in extremely cold weather. When the technology of forced air heaters was developed and such units were made available, the ERR replaced the electric heaters with the more effective hot air units. As well, windshield wipers had not been invented when the first streetcars were purchased by the City of Edmonton. When they were developed and began to appear on other vehicles, attempts were made at installing them on the streetcars.

Most changes from obsolete technology to more efficient types came about only if the capital cost was not excessive. Most of the

wooden passenger streetcar bodies were overhauled and kept in good repair because wood and the necessary wood working tools were inexpensive and repairs to such vehicles were usually a simple series of operations. The electrical apparatus, which was costly, was not changed on most of the streetcars although the K-6 controller was obsolete by 1930 and was known not to be as efficient or safe as the K-35 controller that had been supplied with the five new Ottawa Car Manufacturing Company streetcars delivered in 1930. By not upgrading the electrical apparatus or by not replacing the older streetcars with newer and more efficient designs, the Street Railway Department ensured the demise of the street railway. The lack of permanent track combined with obsolete and inefficient rolling stock meant that large capital expenditures were required if the street railway was to be retained. Motor and trolley buses were seen to be less costly and more flexible than streetcars. It is for that reason that the street railway system was phased out. Other cities, such as Toronto, chose to maintain its trackage and to replace obsolete rolling stock with newer equipment. By making frequent changes, Toronto still operates a viable street railway system.

A similar observation can be seen in the equipment used for the electrical power generation for the street railway. The system of reciprocating steam engines which were used to rotate generators was used by the ERR since its beginning. By the late 1920's, this type of power generation was considered inefficient and obsolete. The acquisition of more efficient mercury arc rectifiers came about not because the City realized that they were more efficient than engine driven generators. The rectifiers were purchased because one of the steam engines became irreparably damaged and a replacement would have cost more than a mercury arc rectifier. In this instance, the cost factor contributed to

the improvement of the existing technology. A similar development enabled the mercury arc rectifiers to be gradually replaced with solid state units which were more efficient. It should be noted that the longevity of most power generation equipment is a contributing point in favor of the retention of electrically-powered vehicles.

Ultimately, cost has been the deciding factor which has determined the type of fuel used by motor buses. It should be noted that the first motor buses had their gasoline engines replaced by diesel engines at an early stage even though diesel engines had rarely been used. This was done because it was discovered that diesel fuel was much cheaper than gasoline and by using diesel fuel in its buses, the Street Railway Department could save money. It is for this reason that subsequent motor buses were purchased which were equipped with diesel engines. Diesel fuel, however, became an essential commodity during the Second World War and supplies of it became scarce. This development forced the Street Railway Department to obtain motor buses equipped with gasoline engines. At the earliest opportunity, the transit system attempted to use a different fuel that was less expensive, hence the development of propane powered engines. By 1960, diesel fuel had become readily available again and most bus manufacturers discontinued the production of propane units. Lack of availability forced the transit system to readopt the use of diesel buses. In these instances, the transit system had little control over the type of fuel used since it did not have the resources or the technology to construct engines. The various uses of motor fuel, therefore, have been a result of changes in the bus manufacturing industry which responded to prevalent political and economic conditions.

In spite of the many changes in the types of rolling stock, it is apparent from the findings in this report that electrically powered vehicles

have had a much longer useful life than motor buses. Many streetcars, for example, remained in service over 40 years and at the end of street railway service, much of the electrical apparatus was still serviceable, although obsolete. Most trolley buses have lasted longer than most motor buses. The electrical apparatus, in fact, has outlived some trolley bus bodies and has been reused in some newer trolley buses.

The electrical generation and distribution equipment, although increasing the capital cost of trolley buses, has proven to be extremely long lived. It should be noted that the earliest mercury arc rectifier had been in service for 50 years before it was considered to be uneconomical to repair and keep in service. Most motor buses because of their many moving parts require expensive and frequent maintenance and usually do not last as long as trolley buses. Frequent economic studies have occasionally shown trolley buses not to be as economical to operate as motor buses. Given the longevity of trolley buses and the required ancillary equipment; and given the volatile nature of fuel prices, it seems foolish that the City would entertain the idea of replacing trolley buses with motor buses. In addition, although the wires required for trolley buses can be considered visual pollution, trolley buses do not produce noxious air pollutants whereas motor buses do. Motor buses, as well, are no more esthetically pleasing than trolley buses or any other type of public transportation vehicle.

Despite a preoccupation with cost, the transit system has also made safety and rider comfort high priorities. The first streetcars which had single fixed steps on both sides were found to be unsafe when some individuals sustained injuries while trying to board a streetcar from the wrong side. This situation led to the ERR adopting a sliding step on newer equipment in order to reduce the likelihood of individuals attempting

to board a streetcar from the wrong side. In response to many complaints about the height of the various types of single steps, the ERR designed a double step with a folding bottom tread. This design increased the number of step treads while maintaining a safety feature. Air brakes were installed on most passenger streetcars well ahead of federal legislation requiring air brakes because many citizens had expressed concern that the hand brakes used on the streetcars could be inadequate on some of the steep grades found on the ERR. Although the cost of the air brake equipment was high, the ERR endeavoured to improve the safety of its streetcars in order to satisfy the wishes of its customers. The use of forced air heaters on the streetcars, while not improving the operation of the streetcars, did make the streetcars more comfortable for both the passengers and the motormen. The installation of right-hand rear view mirrors on the streetcars also improved safety since the mirror enabled a motorman to see any pedestrians or vehicles that could get pinned between the streetcar and the curb when the streetcar made a right turn.

Occasionally, the installation of safety equipment or modifications to safety equipment came about because a safety hazard was not realized. Such oversights usually resulted in injuries or the loss of life. These incidents usually resulted in law suits which cost the City more than the cost of installing the required equipment in the first instance. One such example occurred with the single end streetcars. Originally, no warning or safety devices were placed at the rear of such streetcars. If someone happened to be in the way of a backing streetcar and they were unaware of its approach, they could be seriously injured or killed. Although people were not supposed to be located behind a backing streetcar, they occasionally were. In 1912, for instance, a young child playing

on the Y at 95th Street and 118th Avenue was killed by a backing streetcar because he did not realize the streetcar was approaching, nor did the streetcar conductor realize that the child was there until the streetcar was too close to stop. The lack of a warning device prevented the conductor from being able to sound any warning. The lack of any safety features resulted in the child being crushed by the rear truck. After unpleasant publicity and a stiff lawsuit, gongs were installed on the rear platforms of all single end streetcars. In addition, it should be noted that all new single end streetcars that were purchased subsequently were equipped with some form of warning device at the rear. In the case of the big Preston streetcars purchased in 1913, motor and brake controls were also installed in the rear vestibule.

In spite of such occurrences in the past, the present management of the transit system appears to be unaware of most of the past problems and developments of transportation technology. Examples of this can be found in the present LRT system. The system was designed so that the LRT cars did not travel along any streets shared by pedestrians and vehicles. The LRT cars, however, cross some streets at grade and, therefore, present a danger to motorists and pedestrians. Crossing barriers and warning signs are supposed to keep pedestrians and motorists away from crossings when the LRT cars approach and occupy the crossings. The potential for mishaps prevails. It was noted that the lifeguard provided with each Duewag LRT truck was considered equivalent to the lifeguard supplied with the Brill 21-E streetcar truck of 1908. That safety device was found to be inadequate at that time and was improved by the installation of a lifeguard that physically surrounded a prone individual. It is disturbing, therefore, to note that adequate lifeguards have not been installed on the LRT vehicles. Although LRT vehicles

are not streetcars and people should not get in their way, the prospect exists that a serious mishap can occur. One such example could be a child or a senior citizen falling across a track at a crossing immediately before arrival of an LRT vehicle. Given the reaction time of the equipment and the motorman, it is possible that the individual would be crushed by the lead truck of the LRT car. An equally tragic mishap could occur if a person should inadvertently fall from a platform onto the track in front of an approaching LRT car. The lifeguards supplied with the LRT cars, like the lifeguards supplied with the Brill 21-E truck, have the potential to enable a prone individual to be crushed by the truck. The use of a lifeguard similar to the Hudson-Bowring type used on Edmonton's streetcars after 1912 would improve the safety of the LRT cars and could prevent the needless loss of life.

The selection of suitable warning devices has also been a problem with the LRT cars. The supplied warning horns tend to resemble automobile horns and are not readily associated with large vehicles. The addition of alarm gongs has not improved the effectiveness of the warning devices. Although gongs were used on streetcars, such vehicles have not appeared in Edmonton since 1951 and there are many citizens who have never heard or seen a streetcar. Upon hearing a gong, such people are likely to be confused rather than warned of the imminent approach of a large vehicle. Two possible solutions to this problem could be implemented. A public awareness campaign could be undertaken to educate the public as to the meaning of the alarm gongs. If this action is unfeasible, a warning device associated with the trains, such as an air horn or whistle, could be installed using self-contained air-operated devices. It is essential, in any case, that the public not confuse an LRT warning device with a warning device found on some other type of vehicle.

This observation has raised another point: the reluctance of some public employees to assist researchers because their findings might be seen as damaging to their department's image. It should be realized by all civic employees that they work for a publicly owned corporation which, by its nature, must be open to public scrutiny and input. There is a bylaw at the municipal level, as well as similar laws at the provincial and federal levels, which guarantees each citizen the right to peruse and inspect the information contained in public bodies. To be sure, most public employees, City departments as well as private companies and individuals, were extremely generous and helpful to the author and made the job of research gathering an extremely accurate and pleasant task. (See also Appendix II) Some public employees, however, felt that it was not required that they be of assistance since they were not interested in such public relations or because they did not see any merit to this kind of historical research.

This attitude is disturbing not only because it shows a lack of understanding and a disdain for truthful and scholarly research, but also because it shows a lack of respect for the individual citizens who are taxpayers and, therefore, are entitled to common courtesy.

Recommendations

This report, which has chronicled the history and the development of public transportation in Edmonton, has results that can be used by educators, historians, researchers and museums. The format and the content of this report have been designed to facilitate the use of them by industrial arts (practical arts), vocational education, and social studies teachers and curriculum planners for secondary education. Chapter I noted that most industrial arts (practical arts) and vocational education

programs lack content that describes the development of specific technologies and their relevance and practical applications in the past as well as their impact upon present society. This report has shown examples of where wood, plastic, metal, electricity, power, drafting and electronics technologies have all been essential parts of the development of public transportation technology in Edmonton. The report has also shown that, for various reasons, the application and the prevalence of some forms of technology have become obsolete, while other technologies have either remained applicable or new technologies have been devised to satisfy a specific need. If nothing else, the inclusion of such historical information in an industrial arts (practical arts) curriculum will provide the student with an understanding of why technology is constantly changing and why certain technologies are being taught while others are not.

It is recommended that this report be used as resource material by educators to enable them to obtain useful and interesting background information on the development of certain technologies and to enable them to prepare accurate and useful units of study. The chronological format of the report lends itself to easy selection of material from all periods covered in the report. The use of tables, illustrative material and rosters provides the reader with tangible means of comparison between types of vehicles as well as between construction and maintenance methods. The inclusion of Appendix I, which contains a summary of all rolling stock used by the transit system within the time boundaries of this report, enables the reader to discern easily the important features of each vehicle. In addition, the Appendix also enables quick comparisons between types and makes of vehicles, as well as the various changes made to the vehicles. These features increase the usefulness of the report since they present concise summaries of significant points. Because

the technological development of the transit system has been closely aligned with socio-economic conditions, the reader can also obtain an understanding of the conditions prevalent during each period covered.

The chronological and the practical nature of the report should enable civil employees to obtain adequate knowledge of previous developments and problems in the transit system. Some of this knowledge should be applied to the current technologies in order to make them safer and more efficient. It is also possible that some obsolete technologies described in the report, such as the movement of freight by the street railway, may provide civil employees with ideas for similar technologies that could be implemented. The report, therefore, could be used to increase the revenues of the transit system.

Since the development of public transportation in Edmonton usually reflected developments within the transportation industry, the research methods, findings and the format of this report should be applied to other technological studies in aspects of transportation. The logical design of the report, however, should enable researchers to apply the design to other aspects of technological development which are not related to transportation.

The detailed description of the technical aspects of the various vehicles and systems should enable individuals engaged in restoration to be able to restore or to reconstruct vehicles that accurately reflect the materials and the technologies of the various periods. The explanation of the various safety devices, as well, should also enable restorers to ensure that operational preserved vehicles do not pose serious safety hazards to the public.

The need for further studies in aspects of historical technology is great. Without a proper understanding of past technologies and the problems encountered with them, many difficulties and problems experienced in the past may be encountered in the future.

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Appendix I

This Appendix, which is divided into three main categories, contains a listing of all passenger, freight and service rolling stock and vehicles used by the municipally-owned public transportation system in Edmonton since its beginning in 1908. The listing includes all vehicles up to and including the early 1980's. In addition to the vehicle identification, general dimensions and weight are included where they are available. No weights are listed for streetcars and other railed vehicles, since accurate weights were not always available. In addition, many changes and modifications to the various types of railed vehicles drastically altered their weights, so the inclusion of a single weight for each vehicle would have been misleading.

Information relevant to the type of motive power of each vehicle is included as well as significant dates in the life of the vehicle. Each vehicle is listed chronologically, not by number, but by its date of arrival in the City of Edmonton. Some units appear in the listing several times because they were assigned different numbers or designations throughout their lives. In such cases, cross-referencing comments are provided in order to prevent reader confusion. Leased vehicles as well as units purchased from other properties for parts only are listed.

By including this Appendix, and by arranging it in this chronological fashion, the reader should be able to more easily follow the chronological descriptions of rolling stock in the text. In addition, the reader can also obtain an overall impression about the types or makes of rolling stock and vehicles by perusing this Appendix.

Index of Abbreviations for Appendix I

AC	Allis Chalmers
ACF	American Car and Foundry
AEC	Associated Equipment Company
ALCO	American Locomotive Company
B.C.	British Columbia
BBC	Brown Boveri Company
B Boveri	Brown Boveri Company
CCF	Canadian Car and Foundry
CGE	Canadian General Electric
DE	Double End
Duewag	Waggonfabrik Uerdingen
EE	English Electric
ERR	Edmonton Radial Railway
ET	Edmonton Transit
ETS	Edmonton Transit or Transportation System
FE-CE	Front Entrance - Centre Exit
FIL	Flyer Industries Limited
FTC	Fageol Twin Coach
GE	General Electric (United States)
GEC	General Electric Company (British)
GMC	General Motors Coach
h	Hour
H.P.	Horse Power
kg	Kilogram
km	Kilometre
kN	Kilonewton

kPa	Kilopascal
kW	Kilowatt
Lbs.	Pounds
LRT	Light Rail Transit
m	Metre
McG-C	McGuire-Cummings
MCB	Master Car Builders
mm	Millimetre
MRC	Magnetic Remote Control
MU	Multiple Unit Operation
N/A	Not Applicable
NAR	Northern Alberta Railways
N.B.	New Brunswick
OCC	Ottawa Car Company
OCM	Ottawa Car Manufacturing Company
PAYE	Pay As You Enter
PC&C	Preston Car and Coach Company
SE	Single End
TDH	Transit Diesel Hydraulic
TTC	Toronto Transit or Transportation Commission
T&YRR	Toronto and York Radial Railway
U.L.	Underwriters' Laboratory
WFC	Western Flyer Company
WH	Westinghouse

This section of the Appendix contains a chronological listing of all passenger, freight, and service streetcars obtained and operated between 1908 and 1951. This section also includes a listing of all passenger, freight, and service LRT vehicles obtained between 1978 and 1982.

The information includes: the vehicle number, delivery condition, date ordered, delivery date, major dimensions, seating capacity, type of trucks, make and type of motors, withdrawl date, disposal date, and any remarks cogent to the vehicle.

CAR NUMBER: 2 SEATING: 40
DELIVERY CONDITION: ELECTRICS NOT INSTALLED
MFR/MODEL: OCC, DE

LENGTH: 38'6.5"(11 748 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BRILL 27-GE-1
ROOF TYPE: MONITOR, STRAIGHT ENDS

ORDERED: 8/1908 WITHDRAWN: 11/1918
DELIVERY: 10/26, 1908 DISPOSAL: FRAME FOR SWEEPER 3
REMARKS: WRECKED BY TRAIN

CAR NUMBER: 1 SEATING: 40
DELIVERY CONDITION: ELECTRICS NOT INSTALLED
MFR/MODEL: OCC, DE

LENGTH: 38'6.5"(11 748 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BRILL 27-GE-1
ROOF TYPE: MONITOR, STRAIGHT ENDS

ORDERED: 8/1908 WITHDRAWN: 9/1, 1951
DELIVERY: 10/31, 1908 DISPOSAL: N/A
REMARKS: REBUILT SE IN 1929, NOW AT FORT EDMONTON PARK

CAR NUMBER: 3 SEATING: 40
DELIVERY CONDITION: ELECTRICS NOT INSTALLED
MFR/MODEL: OCC, DE

LENGTH: 38'6.5"(11 748 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BRILL 27-GE-1
ROOF TYPE: MONITOR, STRAIGHT ENDS

ORDERED: 8/1908 WITHDRAWN: 1927; 1947
DELIVERY: 11/7, 1908 DISPOSAL: 6/1948
REMARKS: REUSED & REBUILT, SE IN 1929

CAR NUMBER: 4 SEATING: 40
DELIVERY CONDITION: ELECTRICS NOT INSTALLED
MFR/MODEL: OCC, DE

LENGTH: 38'6.5"(11 748 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BRILL 27-GE-1
ROOF TYPE: MONITOR, STRAIGHT ENDS

ORDERED: 8/1908 WITHDRAWN: 1947
DELIVERY: 11/9, 1908 DISPOSAL: 1948
REMARKS: REBUILT SE IN 1912

CAR NUMBER: 5 SEATING: 40
DELIVERY CONDITION: ELECTRICS NOT INSTALLED
MFR/MODEL: OCC, DE

LENGTH: 38'6.5"(11 748 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BRILL 27-GE-1
ROOF TYPE: MONITOR, STRAIGHT ENDS

ORDERED: 8/1908 WITHDRAWN: 1947
DELIVERY: 11/18, 1908 DISPOSAL: 1948
REMARKS: REBUILT SE IN 1912

CAR NUMBER: 6 SEATING: 40
DELIVERY CONDITION: ELECTRICS NOT INSTALLED
MFR/MODEL: OCC, DE

LENGTH: 38'6.5"(11 748 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BRILL 27-GE-1
ROOF TYPE: MONITOR, STRAIGHT ENDS

ORDERED: 8/1908 WITHDRAWN: 1947
DELIVERY: 11/22, 1908 DISPOSAL: 1948
REMARKS: REBUILT SE IN 1912

CAR NUMBER: 7 SEATING: 32
DELIVERY CONDITION: ELECTRICS NOT INSTALLED
MFR/MODEL: OCC, DE

LENGTH: 31'10"(9 703 mm) MOTORS: 2, GE-80A-1
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BRILL 21-E
ROOF TYPE: MONITOR, STRAIGHT ENDS

ORDERED: 8/1908 WITHDRAWN: BEFORE 10/1911, 12/1927
DELIVERY: 12/14, 1908 DISPOSAL: 1928
REMARKS: REUSED AS PASSENGER CAR

CAR NUMBER: 10 SEATING: 40
DELIVERY CONDITION: AIR BRAKES NOT INSTALLED
MFR/MODEL: PC&C, DE, PAYE

LENGTH: 42'(12 802 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BEMIS 45
ROOF TYPE: MONITOR, BULLNOSE ENDS

ORDERED: 12/1908 WITHDRAWN: 1938
DELIVERY: 6/1909 DISPOSAL: 1947
REMARKS: USED FOR PARTS

CAR NUMBER: 12 SEATING: 40
DELIVERY CONDITION: AIR BRAKES NOT INSTALLED
MFR/MODEL: PC&C, DE, PAYE

LENGTH: 42'(12 802 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BEMIS 45
ROOF TYPE: MONITOR, BULLNOSE ENDS

ORDERED: 12/1908 WITHDRAWN: 1948
DELIVERY: 6/1909 DISPOSAL: 1948
REMARKS: SE IN 1919; AGAIN SE IN 1929

CAR NUMBER: 14 SEATING: 40
DELIVERY CONDITION: AIR BRAKES NOT INSTALLED
MFR/MODEL: PC&C, DE, PAYE

LENGTH: 42'(12 802 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BEMIS 45
ROOF TYPE: MONITOR, BULLNOSE ENDS

ORDERED: 12/1908 WITHDRAWN: 5/1938
DELIVERY: 7/1909 DISPOSAL: 1941
REMARKS: SE IN 1914; LIBRARY CAR, 1941

CAR NUMBER: 16 SEATING: 40
DELIVERY CONDITION: AIR BRAKES NOT INSTALLED
MFR/MODEL: PC&C, DE, PAYE

LENGTH: 42'(12 802 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BEMIS 45
ROOF TYPE: MONITOR, BULLNOSE ENDS

ORDERED: 12/1908 WITHDRAWN: 1948
DELIVERY: 7/1909 DISPOSAL: 1948
REMARKS: SE IN 1917; RETIRED 1938; REUSED 1943

CAR NUMBER: 15 SEATING: 32
DELIVERY CONDITION: ELECTRICS AND AIR BRAKES NOT INSTALLED
MFR/MODEL: OCC, DE, PAYE

LENGTH: 42'(12 802 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BRILL 27-GE-1
ROOF TYPE: MONITOR, BULLNOSE ENDS

ORDERED: 11/1909 WITHDRAWN: 1950
DELIVERY: 7/1910 DISPOSAL: 1951
REMARKS: REBUILT, SE WITHOUT TRUSS-RODS, 1917

CAR NUMBER: 17 SEATING: 32
DELIVERY CONDITION: ELECTRICS AND AIR BRAKES NOT INSTALLED
MFR/MODEL: OCC, DE, PAYE

LENGTH: 42'(12 802 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BRILL 27-GE-1
ROOF TYPE: MONITOR, BULLNOSE ENDS

ORDERED: 11/1909 WITHDRAWN: 9/1949
DELIVERY: 7/1910 DISPOSAL: 2/1950
REMARKS: REBUILT WITHOUT TRUSS-RODS

CAR NUMBER: 18 SEATING: 32
DELIVERY CONDITION: ELECTRICS AND AIR BRAKES NOT INSTALLED
MFR/MODEL: OCC, DE, PAYE

LENGTH: 42'(12 802 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BRILL 27-GE-1
ROOF TYPE: MONITOR, BULLNOSE ENDS

ORDERED: 11/1909 WITHDRAWN: 3/1948
DELIVERY: 8/1910 DISPOSAL: 6/1948
REMARKS:

CAR NUMBER: 19 SEATING: 32
DELIVERY CONDITION: ELECTRICS AND AIR BRAKES NOT INSTALLED
MFR/MODEL: OCC, DE, PAYE

LENGTH: 42'(12 802 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BRILL 27-GE-1
ROOF TYPE: MONITOR, BULLNOSE ENDS

ORDERED: 11/1909 WITHDRAWN: 1948
DELIVERY: 8/1910 DISPOSAL: 1948
REMARKS: REBUILT WITHOUT TRUSS-RODS

CAR NUMBER: 20 SEATING: 32
DELIVERY CONDITION: ELECTRICS AND AIR BRAKES NOT INSTALLED
MFR/MODEL: OCC, DE, PAYE

LENGTH: 42'(12 802 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BRILL 27-GE-1
ROOF TYPE: MONITOR, BULLNOSE ENDS

ORDERED: 11/1909 WITHDRAWN: 1948
DELIVERY: 11/1910 DISPOSAL: 1948
REMARKS:

CAR NUMBER: 21 SEATING: 32
DELIVERY CONDITION: ELECTRICS AND AIR BRAKES NOT INSTALLED
MFR/MODEL: OCC, DE, PAYE

LENGTH: 42'(12 802 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BRILL 27-GE-1
ROOF TYPE: MONITOR, BULLNOSE ENDS

ORDERED: 11/1909 WITHDRAWN: 10/22, 1919
DELIVERY: 11/1910 DISPOSAL: 10/1919
REMARKS: SEVERE MISHAP, DESTROYED

CAR NUMBER: 8,9,11,13,22,23 SEATING: 32
DELIVERY CONDITION: N/A
MFR/MODEL: OCC, DE, PAYE

LENGTH: 42'(12 802 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: N/A
ROOF TYPE: MONITOR, BULLNOSE ENDS

ORDERED: 4/1910 WITHDRAWN: N/A
DELIVERY: N/A DISPOSAL: N/A
REMARKS: ORDER RE-NEGOTIATED 10/1910; SEE BELOW

CAR NUMBER: 8 SEATING: 37
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: OCC, SE, PAYE

LENGTH: 42'(12 802 mm) MOTORS: 4, WH-101-B-2
WIDTH: 8'8"(2 642 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BRILL 27-GE-1
ROOF TYPE: MONITOR, BULLNOSE ENDS

ORDERED: 10/1910 WITHDRAWN: 1948
DELIVERY: 4/1911 DISPOSAL: 1948
REMARKS: REBUILT WITHOUT TRUSS RODS

CAR NUMBER: 9 SEATING: 37
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: OCC, SE, PAYE

LENGTH: 42'(12 802 mm) MOTORS: 4, WH-101-B-2
WIDTH: 8'8"(2 642 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BRILL 27-GE-1
ROOF TYPE: MONITOR, BULLNOSE ENDS

ORDERED: 10/1910 WITHDRAWN: 1948
DELIVERY: 4/1911 DISPOSAL: 1948
REMARKS: REBUILT WITHOUT TRUSS RODS

CAR NUMBER: 11 SEATING: 37
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: OCC, SE, PAYE

LENGTH: 42'(12 802 mm) MOTORS: 4, WH-101-B-2
WIDTH: 8'8"(2 642 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BRILL 27-GE-1
ROOF TYPE: MONITOR, BULLNOSE ENDS

ORDERED: 10/1910 WITHDRAWN: 1948
DELIVERY: 4/1911 DISPOSAL: 1948
REMARKS: REBUILT WITHOUT TRUSS RODS

CAR NUMBER: 13 SEATING: 37
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: OCC, SE, PAYE

LENGTH: 42'(12 802 mm) MOTORS: 4, WH-101-B-2
WIDTH: 8'8"(2 642 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BRILL 27-GE-1
ROOF TYPE: MONITOR, BULLNOSE ENDS

ORDERED: 10/1910 WITHDRAWN: 1948
DELIVERY: 4/1911 DISPOSAL: 1948
REMARKS: REBUILT WITHOUT TRUSS-RODS;
NOW AT FORT EDMONTON PARK

CAR NUMBER: 22 SEATING: 37
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: OCC, SE, PAYE

LENGTH: 42'(12 802 mm) MOTORS: 4, WH-101-B-2
WIDTH: 8'8"(2 642 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BRILL 27-GE-1
ROOF TYPE: MONITOR, BULLNOSE ENDS

ORDERED: 10/1910 WITHDRAWN: 6/1917
DELIVERY: 6/1911 DISPOSAL: 1919
REMARKS: FIRE; PARTS USED FOR OBSERVATION CAR

CAR NUMBER: 23 SEATING: 37
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: OCC, SE, PAYE

LENGTH: 42'(12 802 mm) MOTORS: 4, WH-101-B-2
WIDTH: 8'8"(2 642 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BRILL 27-GE-1
ROOF TYPE: MONITOR, BULLNOSE ENDS

ORDERED: 10/1910 WITHDRAWN: 9/1913
DELIVERY: 6/1911 DISPOSAL: 1913
REMARKS: ACCIDENT WITH TRAIN

CAR NUMBER: 28-31 SEATING: 41
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: PC&C, SE, PAYE

LENGTH: 43'6"(13 259 mm) MOTORS: 4, WH-101-B-2
WIDTH: 8'8"(2 642 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BRILL 27-GE-1
ROOF TYPE: MONITOR, BULLNOSE ENDS

ORDERED: 12/1910 WITHDRAWN: 1948-1951
DELIVERY: 6-7/1911 DISPOSAL: 1948-1962
REMARKS: 28, FIRE 1943; REBUILT 1946

CAR NUMBER: 24-27 SEATING: 41
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: OCC, SE, PAYE

LENGTH: 43'6"(13 259 mm) MOTORS: 4, WH-101-B-2
WIDTH: 8'8"(2 642 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: BRILL 27-GE-1
ROOF TYPE: MONITOR, BULLNOSE ENDS

ORDERED: 12/1910 WITHDRAWN: 1948-1951
DELIVERY: 8-9/1911 DISPOSAL: 1948-1951
REMARKS: 24 & 27 REBUILT WITHOUT TRUSS RODS

CAR NUMBER: 32-46 SEATING: 36
DELIVERY CONDITION: ELECTRICS AND AIR BRAKES NOT INSTALLED
MFR/MODEL: ST. LOUIS, DE, PAYE

LENGTH: 45'(13 716 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'8"(2 642 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: ST. LOUIS 47-B
ROOF TYPE: PLAIN ARCH

ORDERED: 2/1912 WITHDRAWN: 1949-1951
DELIVERY: 5-6/1912 DISPOSAL: 1949-1951
REMARKS: REBUILT TO SE; 32, 33, 42 NOW AT FORT EDMONTON PARK

CAR NUMBER: 47-49 SEATING: 44
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: PC&C, SE, PAYE

LENGTH: 45'4.75"(13 837 mm) MOTORS: 4, AC-301
WIDTH: 8'11.5"(2 731 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: STANDARD 0-50
ROOF TYPE: TURTLE BACK

ORDERED: 11/1912 WITHDRAWN: 1951
DELIVERY: 5/1913 DISPOSAL: 1952
REMARKS:

CAR NUMBER: 50 SEATING: 44
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: PC&C, SE, PAYE

LENGTH: 45'4.75"(13 837 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'11.5"(2 731 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: STANDARD 0-50
ROOF TYPE: TURTLE BACK

ORDERED: 11/1912 WITHDRAWN: 6/1918
DELIVERY: 5/1913 DISPOSAL: 6/1918
REMARKS: SOLD TO T&YRR

CAR NUMBER: 51-57 SEATING: 44
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: PC&C, SE, PAYE

LENGTH: 45'4.75"(13 837 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'11.5"(2 731 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: STANDARD 0-50
ROOF TYPE: TURTLE BACK

ORDERED: 11/1912 WITHDRAWN: 1951
DELIVERY: 5-6/1913 DISPOSAL: 1952
REMARKS: NEW ELECTRICS ON 56, 1929

CAR NUMBER: 58 SEATING: 44
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: PC&C, SE, PAYE

LENGTH: 45'4.75"(13 837 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'11.5"(2 731 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: STANDARD 0-50
ROOF TYPE: TURTLE BACK

ORDERED: 11/1912 WITHDRAWN: 6/1918
DELIVERY: 6/1913 DISPOSAL: 6/1918
REMARKS: SOLD TO T&YRR

CAR NUMBER: 59 SEATING: 44
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: PC&C, SE, PAYE

LENGTH: 45'4.75"(13 837 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'11.5"(2 731 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: STANDARD 0-50
ROOF TYPE: TURTLE BACK

ORDERED: 11/1912 WITHDRAWN: 9/1951
DELIVERY: 6/1913 DISPOSAL: 1951
REMARKS:

CAR NUMBER: 60-62 SEATING: 44
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: PC&C, SE, PAYE

LENGTH: 45'4.75"(13 837 mm) MOTORS: 4, WH-101-B-2
WIDTH: 8'11.5"(2 731 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: STANDARD 0-50
ROOF TYPE: TURTLE BACK

ORDERED: 11/1912 WITHDRAWN: 1950-1951
DELIVERY: 6-8/1913 DISPOSAL: 1950-1962
REMARKS: 61 USED AS STORAGE SHED

CAR NUMBER: 63 SEATING: 44
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: PC&C, SE, PAYE

LENGTH: 45'4.75"(13 837 mm) MOTORS: 4, GE-80A-1
WIDTH: 8'11.5"(2 731 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: STANDARD 0-50
ROOF TYPE: TURTLE BACK

ORDERED: 11/1912 WITHDRAWN: 1951
DELIVERY: 9/1913 DISPOSAL: 1952
REMARKS:

CAR NUMBER: 64-74 SEATING: 44
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: PC&C, SE, PAYE

LENGTH: 45'4.75"(13 837 mm) MOTORS: 4, WH-101-B-2
WIDTH: 8'11.5"(2 731 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: STANDARD 0-50
ROOF TYPE: TURTLE BACK

ORDERED: 11/1912 WITHDRAWN: 1948-1951
DELIVERY: 8-9/1913 DISPOSAL: 1948-1952
REMARKS: 73 NOW AT FORT EDMONTON PARK

CAR NUMBER: 75-79 SEATING: 44
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: PC&C, SE, PAYE

LENGTH: 45'4.75"(13 837 mm) MOTORS: 4, WH-101-B-2
WIDTH: 8'11.5"(2 731 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: STANDARD 0-50
ROOF TYPE: TURTLE BACK

ORDERED: 11/1912 WITHDRAWN: 1951
DELIVERY: 4-9/1914 DISPOSAL: 1952
REMARKS:

CAR NUMBER: 81 SEATING: 44
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: PC&C, SE, PAYE

LENGTH: 45'4.75"(13 837 mm) MOTORS: 4, WH-101-B-2
WIDTH: 8'11.5"(2 731 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: STANDARD 0-50
ROOF TYPE: TURTLE BACK

ORDERED: 11/1912 WITHDRAWN: 7/1917
DELIVERY: 6/1914 DISPOSAL: 7/1917
REMARKS: SOLD TO OSHAWA

CAR NUMBER: 80 SEATING: 44
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: PC&C, SE, PAYE

LENGTH: 45'4.75"(13 837 mm) MOTORS: 4, WH-101-B-2
WIDTH: 8'11.5"(2 731 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm) TRUCKS: STANDARD 0-50
ROOF TYPE: TURTLE BACK

ORDERED: 11/1912 WITHDRAWN: 7/1917
DELIVERY: 9/1914 DISPOSAL: 7/1917
REMARKS: SOLD TO OSHAWA

CAR NUMBER: N/A SEATING: 42
DELIVERY CONDITION: N/A
MFR/MODEL: ERR, SE, OBSERVATION

LENGTH: 42'(12 802 mm) MOTORS: 4, WH-101-B-2
WIDTH: 8'8"(2 642 mm) HORSEPOWER: 40 (29.8 kW)
HEIGHT: ? TRUCKS: BRILL 27-GE-1
ROOF TYPE: ARCH

ORDERED: 1919-1920 WITHDRAWN: 1929
DELIVERY: 7/1920 DISPOSAL: 1945
REMARKS: USED FRAME OF 22

CAR NUMBER: 80/2nd-81/2nd SEATING: 51
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: OCM, SE, FE-CE

LENGTH: 45'11.11"(13 998 mm) MOTORS: 4, CGE-247L-1
WIDTH: 8'3"(2 515 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 10'10.5"(3 315 mm) TRUCKS: CCF F-920
ROOF TYPE: PLAIN ARCH

ORDERED: 6/1930 WITHDRAWN: 9/1951
DELIVERY: 11/1930 DISPOSAL: 1954
REMARKS: SOLD; 80 NOW AT FORT EDMONTON PARK

CAR NUMBER: 82-84 SEATING: 51
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: OCM, SE, FE-CE

LENGTH: 45'11.11"(13 998 mm) MOTORS: 4, CGE-247L-1
WIDTH: 8'3"(2 515 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 10'10.5"(3 315 mm) TRUCKS: CCF F-920
ROOF TYPE: PLAIN ARCH

ORDERED: 6/1930 WITHDRAWN: 9/1951
DELIVERY: 11/1930 DISPOSAL: 1957
REMARKS: SCRAPPED

CAR NUMBER: N/A
SEATING: N/A
DELIVERY CONDITION: N/A
MFR/MODEL: ERR, LIBRARY

LENGTH: 42'(12 802 mm)
MOTORS: UNKNOWN
WIDTH: 8'6"(2 591 mm)
HORSEPOWER: 40(29.8 kW)
HEIGHT: 12'(3 658 mm)
TRUCKS: BRILL 27-GE-1
ROOF TYPE: MONITOR, BULLNOSE ENDS

ORDERED: 1941
WITHDRAWN: 8/1949
DELIVERY: 10/1941
DISPOSAL: 10/1949
REMARKS: BUILT FROM 14

CAR NUMBER: 1 SEATING: N/A
DELIVERY CONDITION: ELECTRICS NOT INSTALLED
MFR/MODEL: McG-C, DE, BAGGAGE-SWEEPER

LENGTH: 50'(15 240 mm) MOTORS: 6, GE-80A-1
WIDTH: HORSEPOWER: 40(29.8 kW)
HEIGHT: TRUCKS: McG-C, MCB 10-A
ROOF TYPE: PLAIN ARCH

ORDERED: 1908 WITHDRAWN: 1951
DELIVERY: 4/1909 DISPOSAL: 1951
REMARKS: CONVERTED TO S.E. IN 1918

CAR NUMBER: S-1 SEATING: N/A
DELIVERY CONDITION: ELECTRICS NOT INSTALLED
MFR/MODEL: PC&C, DE, SPRINKLER

LENGTH: 28' MOTORS: 2, GE-80A-1
WIDTH: 8' HORSEPOWER: 40(29.8 kW)
HEIGHT: 10'6"(3 200) TRUCKS: BEMIS 45
ROOF TYPE: DUCK HOODS

ORDERED: 5/1909 WITHDRAWN: 1921
DELIVERY: 9/1909 DISPOSAL: 1925
REMARKS: TANK SOLD, FRAME USED FOR 5

CAR NUMBER: 2 SEATING: N/A
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: OCC, SE, SWEEPER

LENGTH: 32'(9 754 mm) MOTORS: 3 WH-101-B-2
WIDTH: 7'(2 134 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: TRUCKS: OCC, PEDESTAL
ROOF TYPE: PLAIN ARCH

ORDERED: 8/1910 WITHDRAWN: 1949
DELIVERY: 12/1910 DISPOSAL: 2/1950
REMARKS: RENUMBERED 3 IN 1928

CAR NUMBER: ?S-3? SEATING: N/A
DELIVERY CONDITION: N/A
MFR/MODEL: OCC, ERR, SAND CAR

LENGTH: 31'10"(9 703 mm) MOTORS: 2, GE-80A-1
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 9'3"(2 819) TRUCKS: BRILL 21-E
ROOF TYPE: MONITOR, STRAIGHT ENDS

BUILT: 8/1908 WITHDRAWN: 4/1915
DELIVERY: BEFORE 10/1911 DISPOSAL: 5/1915
REMARKS: BECAME WORK CAR (LINE CAR)

CAR NUMBER: S-4 SEATING: N/A
DELIVERY CONDITION: ELECTRICS AND AIR BRAKES NOT INSTALLED
MFR/MODEL: McG-C, SE, WORK CAR (FLAT CAR)

LENGTH: MOTORS: 4, WH-101-B-2
WIDTH: HORSEPOWER: 40(29.8 kW)
HEIGHT: TRUCKS: McG-C, MCB 10A
ROOF TYPE: PLAIN ARCH

ORDERED: 2/1912 WITHDRAWN: 1951
DELIVERY: 7/1912 DISPOSAL: 1951
REMARKS: RENUMBERED 4; SCRAPPED

CAR NUMBER: L-1 SEATING: N/A
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: ERR, DE, LINE CAR

LENGTH: 38' MOTORS: 2, GE-80A-1
WIDTH: 8'3" HORSEPOWER: 40(29.8 kW)
HEIGHT: 14'5.5"(4 407) TRUCKS: BEMIS 45
ROOF TYPE: PLAIN ARCH

ORDERED: 1/1913 WITHDRAWN: 1951
DELIVERY: 4/1913 DISPOSAL: 1952
REMARKS: REBUILT TO SE IN 1918; RENUMBERED S-5

CAR NUMBER: S-5 SEATING: N/A
DELIVERY CONDITION: NO AIR BRAKES
MFR/MODEL: CCF/SIMPLEX, SE, DIFFERENTIAL DUMP CAR

LENGTH: MOTORS: 4, GE-80A-1
WIDTH: HORSEPOWER: 40(29.8 kW)
HEIGHT: TRUCKS: CCF, CLASS 110 FREIGHT
ROOF TYPE: FLAT PITCHED

ORDERED: 10/1912 WITHDRAWN: 7/1918
DELIVERY: 4/1913 DISPOSAL: 9/1918
REMARKS: SOLD

CAR NUMBER: S-2 SEATING: N/A
DELIVERY CONDITION: ELECTRICS AND AIR BRAKES NOT INSTALLED
MFR/MODEL: McG-C, DE, SPRINKLER

LENGTH: 28'9"(8 763) MOTORS: 4, WH-101-B-2
WIDTH: 7'6"(2 286) HORSEPOWER: 40(29.8 kW)
HEIGHT: 10'11"(3 327) TRUCKS: McG-C, S-E 60
ROOF TYPE: WOODEN HOODS

ORDERED: 4/1913 WITHDRAWN: 1924
DELIVERY: 5/1913 DISPOSAL: 1925
REMARKS: FRAME USED FOR 6

CAR NUMBER: ?S-6? SEATING: N/A
DELIVERY CONDITION: READY TO RUN
MFR/MODEL: ERR, FLAT CAR

LENGTH: SEE TEXT MOTORS: N/A
WIDTH: SEE TEXT HORSEPOWER: N/A
HEIGHT: SEE TEXT TRUCKS: SEE TEXT
ROOF TYPE: N/A

ORDERED: 12/1913 WITHDRAWN: 1922
DELIVERY: 5/1914 DISPOSAL: 1922
REMARKS: UNMOTORIZED UNIT

CAR NUMBER: ?S-3? SEATING: N/A
DELIVERY CONDITION: N/A
MFR/MODEL: OCC, ERR, SE, WORK CAR (LINE CAR)

LENGTH: 31'10"(9 703 mm) MOTORS: 2, GE-80A-1
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: 9'3"(2 819) TRUCKS: BRILL 21-E
ROOF TYPE: MONITOR, STRAIGHT ENDS

BUILT: 8/1908 WITHDRAWN: 11/1918
DELIVERY: 5/1915 DISPOSAL: 11/1918
REMARKS: USED FOR PASSENGER SERVICE

CAR NUMBER: 2/2nd SEATING: N/A
DELIVERY CONDITION: N/A
MFR/MODEL: ERR, SE, SWEEPER

LENGTH: 38'6.5"(11 748 mm) MOTORS: 5, GE-80A-1
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 40(29.8 kW)
HEIGHT: TRUCKS: BRILL 27-GE-1
ROOF TYPE: PLAIN ARCH

BUILT: 8/1908 WITHDRAWN: 1951
DELIVERY: 11/1918 DISPOSAL: 1951
REMARKS: USED FRAME OF PASSENGER CAR 2

CAR NUMBER: 5 SEATING: N/A
DELIVERY CONDITION: N/A
MFR/MODEL: ERR, SE, BALLAST SPREADER

LENGTH: 28' MOTORS:
WIDTH: 8' HORSEPOWER:
HEIGHT: TRUCKS: BEMIS 45
ROOF TYPE: PLAIN ARCH

ORDERED: N/A WITHDRAWN: 1951
DELIVERY: 9/1922 DISPOSAL: 1951
REMARKS: USED FRAME OF S-1

CAR NUMBER: 6 SEATING: N/A
DELIVERY CONDITION: N/A
MFR/MODEL: ERR, DE, WRECKER

LENGTH: MOTORS:
WIDTH: 7'6"(2 286) HORSEPOWER:
HEIGHT: TRUCKS: McG-C, S-E 60
ROOF TYPE: PLAIN ARCH

ORDERED: N/A WITHDRAWN: 1951
DELIVERY: 7/1925 DISPOSAL: 1951
REMARKS: USED FRAME OF S-2

CAR NUMBER: N/A SEATING: N/A
DELIVERY CONDITION: N/A
MFR/MODEL: ERR, SE, WEED KILLER

LENGTH: 20'10"(6 350) MOTORS: NONE
WIDTH: 8'6"(2 591 mm) HORSEPOWER: N/A
HEIGHT: TRUCKS: BRILL 21-E
ROOF TYPE: NONE

ORDERED: N/A WITHDRAWN: 1937
DELIVERY: 1928 DISPOSAL: 1937
REMARKS: FORMER PASSENGER CAR 7

CAR NUMBER: N/A
SEATING: N/A
DELIVERY CONDITION: N/A
MFR/MODEL: SRD, DE, RAIL GRINDER

LENGTH: 20'10" (6 350)
WIDTH: 8'6"(2 591 mm)
HEIGHT:
ROOF TYPE: NONE
MOTORS: 2, GE-80A-1
HORSEPOWER: 40(29.8 kW)
TRUCKS: BRILL 21-E

ORDERED: N/A
DELIVERY: 1937
WITHDRAWN: 1951
DISPOSAL: 1951
REMARKS: FORMER WEED KILLER, SCRAPPED

CAR NUMBER: 1001-1014 SEATING: 64
DELIVERY CONDITION: ELECTRICS AND INTERIORS UNASSEMBLED
MFR/MODEL: DUEWAG/SIEMENS, RTE1, DE, MU

LENGTH: 24 284 mm MOTORS: 2, SIEMENS 1KB2021-5MB02
WIDTH: 2 650 mm HORSEPOWER: 201 (150 kW)
HEIGHT: 3 320 mm TRUCKS: DUEWAG
ROOF TYPE: PLAIN ARCH

ORDERED: 11/1974 WITHDRAWN: N/A
DELIVERY: 4-8/1977 DISPOSAL: N/A
REMARKS: SOME MODIFICATIONS, 1980

CAR NUMBER: 1015-1017 SEATING: 64
DELIVERY CONDITION: ELECTRICS AND INTERIORS UNASSEMBLED
MFR/MODEL: DUEWAG/SIEMENS, RTE1, DE, MU

LENGTH: 24 284 mm MOTORS: 2, SIEMENS 1KB2021-5MB02
WIDTH: 2 650 mm HORSEPOWER: 201 (150 kW)
HEIGHT: 3 320 mm TRUCKS: DUEWAG
ROOF TYPE: PLAIN ARCH

ORDERED: 1978 WITHDRAWN: N/A
DELIVERY: 8/1979 DISPOSAL: N/A
REMARKS: SOME DIFFERENCES FROM 1001-1014

CAR NUMBER: 1018-1021 SEATING: 64
DELIVERY CONDITION: ELECTRICS AND INTERIORS UNASSEMBLED
MFR/MODEL: DUEWAG/SIEMENS, RTE1, DE, MU

LENGTH: 24 284 mm MOTORS: 2, SIEMENS 1KB2021-5MB02
WIDTH: 2 650 mm HORSEPOWER: 201 (150 kW)
HEIGHT: 3 320 mm TRUCKS: DUEWAG
ROOF TYPE: PLAIN ARCH

ORDERED: 1981 WITHDRAWN: N/A
DELIVERY: 12/1982 DISPOSAL: N/A
REMARKS: SOME DIFFERENCES FROM 1015-1017

CAR NUMBER: 1022-1037 SEATING: 64
DELIVERY CONDITION: ELECTRICS AND INTERIORS UNASSEMBLED
MFR/MODEL: DUEWAG/SIEMENS, RTE1, DE, MU

LENGTH: 24 284 mm MOTORS: 2, SIEMENS 1KB2021-5MB02
WIDTH: 2 650 mm HORSEPOWER: 201 (150 kW)
HEIGHT: 3 320 mm TRUCKS: DUEWAG
ROOF TYPE: PLAIN ARCH

ORDERED: 1981 WITHDRAWN: N/A
DELIVERY: 1-2/1983 DISPOSAL: N/A
REMARKS: SOME DIFFERENCES FROM 1015-1017

CAR NUMBER: 2001 SEATING: 51069
DELIVERY CONDITION: NEEDED REPAIRS
MFR/MODEL: ALCO (1912), CENTRE-CAB LOCOMOTIVE

LENGTH: MOTORS: 4, GE
WIDTH: HORSEPOWER:
HEIGHT: TRUCKS: ALCO
ROOF TYPE: PLAIN ARCH

PURCHASED: 1979 WITHDRAWN: N/A
DELIVERY: 3/1980 DISPOSAL: N/A
REMARKS: REFURBISHED BY ET

CAR NUMBER: 2101 SEATING: N/A
DELIVERY CONDITION: NAR BOX CAR
MFR/MODEL: ET, FLAT CAR

LENGTH: 32' (9 754 mm) MOTORS: N/A
WIDTH: HORSEPOWER: N/A
HEIGHT: TRUCKS: ARCH BAR
ROOF TYPE: N/A

BUILT: 1980 WITHDRAWN: N/A
DELIVERY: 1980 DISPOSAL: N/A
REMARKS:

CAR NUMBER: 2102 SEATING: N/A
DELIVERY CONDITION: NAR IDLER CAR
MFR/MODEL: ET, FLAT CAR

LENGTH: 40' (12 192 mm) MOTORS: N/A
WIDTH: HORSEPOWER: N/A
HEIGHT: TRUCKS: BETTENDORF
ROOF TYPE: N/A

BUILT: 1980 WITHDRAWN: N/A
DELIVERY: 1980 DISPOSAL: N/A
REMARKS:

CAR NUMBER: 2103 SEATING: N/A
DELIVERY CONDITION: VARIOUS PARTS
MFR/MODEL: ET, FLAT CAR

LENGTH: 40' (12 192 mm) MOTORS: N/A
WIDTH: HORSEPOWER: N/A
HEIGHT: TRUCKS: BETTENDORF
ROOF TYPE: N/A

BUILT: 1980 WITHDRAWN: N/A
DELIVERY: 1980 DISPOSAL: N/A
REMARKS:

CAR NUMBER: 2201 SEATING: N/A
DELIVERY CONDITION: NAR PLOW CAR
MFR/MODEL: ET/KML, DEPRESSED CENTRE FLAT CAR

LENGTH: 40' (12 192 mm) MOTORS: N/A
WIDTH: HORSEPOWER: N/A
HEIGHT: TRUCKS: BETTENDORF
ROOF TYPE: N/A

BUILT: 1980 WITHDRAWN: N/A
DELIVERY: 1981 DISPOSAL: N/A
REMARKS:

CAR NUMBER: 2301 SEATING: N/A
DELIVERY CONDITION: NAR TANK CAR
MFR/MODEL: ET/KML, DIFFERENTIAL DUMP CAR

LENGTH: 40' (12 192 mm) MOTORS: N/A
WIDTH: 8'5" (2 591 mm) HORSEPOWER: N/A
HEIGHT: TRUCKS: BETTENDORF
ROOF TYPE: N/A

BUILT: 1980 WITHDRAWN: 7/1981
DELIVERY: 1980 DISPOSAL: 1981
REMARKS: MISHAP WHILE DUMPING, SCRAPPED

CAR NUMBER: 2302-2303 SEATING: N/A
DELIVERY CONDITION: NAR TANK CARS
MFR/MODEL: ET/KML, DIFFERENTIAL DUMP CAR

LENGTH: 40' (12 192 mm) MOTORS: N/A
WIDTH: 8'5" (2 591 mm) HORSEPOWER: N/A
HEIGHT: TRUCKS: BETTENDORF
ROOF TYPE: N/A

BUILT: 1980 WITHDRAWN: N/A
DELIVERY: 1980 DISPOSAL: N/A
REMARKS:

CAR NUMBER: 2304 SEATING: N/A
DELIVERY CONDITION: NAR TANK CAR
MFR/MODEL: ET/KML, DIFFERENTIAL DUMP CAR

LENGTH: 40' (12 192 mm) MOTORS: N/A
WIDTH: 8'5" (2 591 mm) HORSEPOWER: N/A
HEIGHT: TRUCKS: BETTENDORF
ROOF TYPE: N/A

BUILT: 1980 WITHDRAWN: 12/1980
DELIVERY: 1980 DISPOSAL: 1981
REMARKS: FRAME BROKE IN SERVICE, SCRAPPED

CAR NUMBER: 2305-2307 SEATING: N/A
DELIVERY CONDITION: NAR TANK CARS
MFR/MODEL: ET/KML, DIFFERENTIAL DUMP CAR

LENGTH: 40' (12 192 mm) MOTORS: N/A
WIDTH: 8'5" (2 591 mm) HORSEPOWER: N/A
HEIGHT: TRUCKS: BETTENDORF
ROOF TYPE: N/A

BUILT: 1980 WITHDRAWN: N/A
DELIVERY: 1980 DISPOSAL: N/A
REMARKS:

CAR NUMBER: 2308 SEATING: N/A
DELIVERY CONDITION: NAR IDLER CAR
MFR/MODEL: ET/KML, DIFFERENTIAL DUMP CAR

LENGTH: 40' (12 192 mm) MOTORS: N/A
WIDTH: 8'5" (2 591 mm) HORSEPOWER: N/A
HEIGHT: TRUCKS: BETTENDORF
ROOF TYPE: N/A

BUILT: 1980 WITHDRAWN: N/A
DELIVERY: 1980 DISPOSAL: N/A
REMARKS:

CAR NUMBER: 2309 SEATING: N/A
DELIVERY CONDITION: NAR TANK CAR
MFR/MODEL: ET/KML, DIFFERENTIAL DUMP CAR

LENGTH: 32' (9 754 mm) MOTORS: N/A
WIDTH: 8'5" (2 591 mm) HORSEPOWER: N/A
HEIGHT: TRUCKS: BETTENDORF
ROOF TYPE: N/A

BUILT: 1980 WITHDRAWN: N/A
DELIVERY: 1980 DISPOSAL: N/A
REMARKS: NO END PLATFORMS

CAR NUMBER: 2310 SEATING: N/A
DELIVERY CONDITION: NAR STOCK CAR
MFR/MODEL: ET/KML, DIFFERENTIAL DUMP CAR

LENGTH: 40' (12 192 mm) MOTORS: N/A
WIDTH: 8'5" (2 591 mm) HORSEPOWER: N/A
HEIGHT: TRUCKS: BETTENDORF
ROOF TYPE: N/A

BUILT: 1980 WITHDRAWN: N/A
DELIVERY: 1980 DISPOSAL: N/A
REMARKS:

This section of the Appendix contains a chronological listing of all new and used motor buses obtained and operated between 1932 and 1981. This section also includes a listing of leased motor buses used by the City at various times.

The information includes: the bus number, the serial number (if available), the manufacturers and the model designation, major dimensions, vehicle weight, engine designation and rating, fueltype, seating capacity, order and delivery dates, disposal date, and any cogent remarks.

BUS NUMBER: 1 SERIAL NUMBER:

MFR/MODEL: CHASSIS-LEYLAND LKP.3 "CUB", BODY - CCF

LENGTH: 24'(7 315 mm) ENGINE: LEYLAND 6-CYL.
WIDTH: HORSEPOWER: 68(50.7 kW)
HEIGHT: FUEL: GASOLINE
WEIGHT: 9,700 lbs.(4 400 kg) SEATING: 21

ORDERED: 1/1932 WITHDRAWN: 1944
DELIVERY: 1/1932 DISPOSAL: 8/1944
REMARKS: BLT. 1931, RE-ENGINED 1936, LEYLAND DIESEL 70 H.P.(52.2 kW)

BUS NUMBER: 2 SERIAL NUMBER:

MFR/MODEL: CHASSIS - WHITE 613, BODY - CCF

LENGTH: ENGINE: WHITE 6-CYL.
WIDTH: HORSEPOWER: 70(52.2 kW)
HEIGHT: FUEL: GASOLINE
WEIGHT: 10,000 lbs.(4 536 kg) SEATING: 21

ORDERED: 1/1932 WITHDRAWN: 5/1947
DELIVERY: 3/1932 DISPOSAL: 1947
REMARKS:

BUS NUMBER: 3 SERIAL NUMBER:

MFR/MODEL: CHASSIS-G.M.C. U, BODY-FANE AUTO WORKS, EDMONTON

LENGTH: ENGINE: BUICK 6-CYL.
WIDTH: HORSEPOWER: 94(70 kW)
HEIGHT: FUEL: GASOLINE
WEIGHT: 13,650 lbs.(6 192 kg) SEATING: 25

ORDERED: 1/1932 WITHDRAWN: 1944
DELIVERY: 4/1932 DISPOSAL: 8/1944
REMARKS: RE-ENGINED 1936, LEYLAND DIESEL 70 H.P.(52.2 kW)

BUS NUMBER: 4 SERIAL NUMBER:

MFR/MODEL: CHASSIS-LEYLAND LTB.1 "LIONESS", BODY - TTC

LENGTH: 30'8"(9 347 mm) ENGINE: LEYLAND 6-CYL.
WIDTH: 8'(2 438 mm) HORSEPOWER: 100(74.6 kW)
HEIGHT: 9'(2 743 mm) FUEL: GASOLINE
WEIGHT: 14,380 lbs.(6 523 kg) SEATING: 27

BUILT: 1930 WITHDRAWN: 8/1947
DELIVERY: 9/1939 DISPOSAL: 1947
REMARKS: FROM TTC ex 558, CONVERTED TO BOOKMOBILE

BUS NUMBER: 5 SERIAL NUMBER: 1376

MFR/MODEL: CHASSIS-LEYLAND LKPZ.4 "CUB", BODY-SMITH BROS.

LENGTH: 24'(7 315 mm) ENGINE: LEYLAND H2B 6-CYL.
WIDTH: HORSEPOWER:
HEIGHT: FUEL: DIESEL
WEIGHT: 11,540 lbs.(5 235 kg) SEATING: 23

ORDERED: 1939 WITHDRAWN: 1954
DELIVERY: 12/1939 DISPOSAL: 1954
REMARKS: RE-ENGINED 1949, CHRYSLER GASOLINE; PRESERVED BY ETS

BUS NUMBER: 6 SERIAL NUMBER:

MFR/MODEL: CHASSIS-LEYLAND LKPZ.4 "CUB", BODY-SMITH BROS.

LENGTH: 24'(7 315 mm) ENGINE: LEYLAND H2B 6-CYL.
WIDTH: HORSEPOWER:
HEIGHT: FUEL: DIESEL
WEIGHT: 11,540 lbs.(5 235 kg) SEATING: 23

ORDERED: 2/1940 WITHDRAWN: 1951
DELIVERY: 4/1940 DISPOSAL: 1951
REMARKS: RE-ENGINED 1949, CONVERTED TO BOOKMOBILE

BUS NUMBER: 7 SERIAL NUMBER: 4735

MFR/MODEL: CHASSIS-LEYLAND LTB.S "LIONESS", BODY-SMITH BROS.

LENGTH: ENGINE: LEYLAND "TIGER" 6-CYL.
WIDTH: HORSEPOWER: 58(43.3 kW)
HEIGHT: FUEL: DIESEL
WEIGHT: 16,000 lbs.(7 258 kg) SEATING: 27

ORDERED: 5/1940 WITHDRAWN: 1954
DELIVERY: 10/1940 DISPOSAL: 1954
REMARKS: RE-ENGINED 1949, CHRYSLER GASOLINE

BUS NUMBER: 8 SERIAL NUMBER: 13156

MFR/MODEL: CHASSIS-LEYLAND LTS.8 "TIGER", BODY-SMITH BROS.

LENGTH: ENGINE: LEYLAND "TIGER" 6-CYL.
WIDTH: HORSEPOWER: 58(43.3 kW)
HEIGHT: FUEL: DIESEL
WEIGHT: 16,125 lbs.(7 314 kg) SEATING: 30

ORDERED: 2/1941 WITHDRAWN: 1954
DELIVERY: 3/1941 DISPOSAL: 1954
REMARKS: RE-ENGINED 1949, CHRYSLER GASOLINE

BUS NUMBER: 9 SERIAL NUMBER: 13157

MFR/MODEL: CHASSIS-LEYLAND LTS.8 "TIGER", BODY-SMITH BROS.

LENGTH:
WIDTH:
HEIGHT:
WEIGHT: 16,125 lbs.(7 314 kg)

ENGINE: LEYLAND "TIGER" 6-CYL.
HORSEPOWER: 58(43.3 kW)
FUEL: DIESEL
SEATING: 30

ORDERED: 2/1941
DELIVERY: 3/1941

WITHDRAWN: 1954
DISPOSAL: 1954

REMARKS: RE-ENGINED 1949, CHRYSLER GASOLINE

BUS NUMBER: 10 SERIAL NUMBER: 13237

MFR/MODEL: CHASSIS-LEYLAND LTS.8 "TIGER", BODY-SMITH BROS.

LENGTH:
WIDTH:
HEIGHT:
WEIGHT: 16,125 lbs.(7 314 kg)

ENGINE: LEYLAND "TIGER" 6-CYL.
HORSEPOWER: 58(43.3 kW)
FUEL: DIESEL
SEATING: 30

ORDERED: 9/1941
DELIVERY: 12/1941

WITHDRAWN: 1954
DISPOSAL: 1954

REMARKS: RE-ENGINED 1949, CHRYSLER GASOLINE

BUS NUMBER: 11 SERIAL NUMBER: 99T-570514

MFR/MODEL: FORD, 29B "VICTORY"

LENGTH: 25'9"(7 849 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 9'1"(2 775 mm)
WEIGHT: 10,000 lbs.(4 536 kg)

ENGINE: FORD V-8
HORSEPOWER: 100(74.6 kW)
FUEL: GASOLINE
SEATING: 27

ORDERED: 8/1943
DELIVERY: 11/1943

WITHDRAWN: 1954
DISPOSAL: 1954

REMARKS:

BUS NUMBER: 12
SERIAL NUMBER: 99T-570515

MFR/MODEL: FORD, 29B "VICTORY"

LENGTH: 25'9"(7 849 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 9'1"(2 775 mm)
WEIGHT: 10,000 lbs.(4 536 kg)

ENGINE: FORD V-8
HORSEPOWER: 100(74.6 kW)
FUEL: GASOLINE
SEATING: 27

ORDERED: 8/1943
DELIVERY: 12/1943
REMARKS:

WITHDRAWN: 1954
DISPOSAL: 1954

BUS NUMBER: 13
SERIAL NUMBER: 99TF-577029

MFR/MODEL: FORD, 29B "VICTORY"

LENGTH: 25'9"(7 849 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 9'1"(2 775 mm)
WEIGHT: 10,000 lbs.(4 536 kg)

ENGINE: FORD V-8
HORSEPOWER: 100(74.6 kW)
FUEL: GASOLINE
SEATING: 27

ORDERED: 8/1943
DELIVERY: 12/1943
REMARKS:

WITHDRAWN: 1954
DISPOSAL: 1954

BUS NUMBER: 14
SERIAL NUMBER: 99T-50774

MFR/MODEL: FORD, 29B "VICTORY"

LENGTH: 25'9"(7 849 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 9'1"(2 775 mm)
WEIGHT: 10,000 lbs.(4 536 kg)

ENGINE: FORD V-8
HORSEPOWER: 100(74.6 kW)
FUEL: GASOLINE
SEATING: 27

ORDERED: 4/1944
DELIVERY: 12/1944
REMARKS: CONVERTED TO PROPANE, 12/1949

WITHDRAWN:
DISPOSAL:

BUS NUMBER: 15 SERIAL NUMBER: 99T-587898

MFR/MODEL: FORD, 29B "VICTORY"

LENGTH: 25'9"(7 849 mm) ENGINE: FORD V-8
WIDTH: 8'(2 438 mm) HORSEPOWER: 100(74.6 kW)
HEIGHT: 9'1"(2 775 mm) FUEL: GASOLINE
WEIGHT: 10,000 lbs.(4 536 kg) SEATING: 27

ORDERED: 4/1944 WITHDRAWN: 1954
DELIVERY: 12/1944 DISPOSAL: 1954
REMARKS:

BUS NUMBER: 16 SERIAL NUMBER: 99T-587902

MFR/MODEL: FORD, 29B "VICTORY"

LENGTH: 25'9"(7 849 mm) ENGINE: FORD V-8
WIDTH: 8'(2 438 mm) HORSEPOWER: 100(74.6 kW)
HEIGHT: 9'1"(2 775 mm) FUEL: GASOLINE
WEIGHT: 10,000 lbs.(4 536 kg) SEATING: 27

ORDERED: 4/1944 WITHDRAWN: 1951
DELIVERY: 1/1945 DISPOSAL: 1951
REMARKS: SOLD

BUS NUMBER: 17-28 SERIAL NUMBER: 46-2167 - 46-2178

MFR/MODEL: CCF-BRILL, C-36

LENGTH: 30'9.5"(9 385 mm) ENGINE: HALL-SCOTT 136, 6-CYL.
WIDTH: 7'11.75"(2 432 mm) HORSEPOWER: 150(112 kW)
HEIGHT: 9'6"(2 896 mm) FUEL: GASOLINE
WEIGHT: 15,085 lbs.(6 843 kg) SEATING: 36

ORDERED: 12/1945 WITHDRAWN: 1959-1969
DELIVERY: 12/1946 DISPOSAL: 1959-1969
REMARKS: SOLD OR SCRAPPED

BUS NUMBER: 29-35
SERIAL NUMBER: 47-2217 - 47-2223

MFR/MODEL: CCF-BRILL, C-36

LENGTH: 30'9.5"(9 385 mm)
WIDTH: 7'11.75"(2 432 mm)
HEIGHT: 9'6"(2 896 mm)
WEIGHT: 15,085 lbs.(6 843 kg)

ENGINE: HALL-SCOTT 136, 6-CYL.
HORSEPOWER: 150(112 kW)
FUEL: GASOLINE
SEATING: 36

ORDERED: 2/1946
DELIVERY: 1947
REMARKS: SOLD OR SCRAPPED

WITHDRAWN: 1957-1968
DISPOSAL: 1957-1968

BUS NUMBER: 36
SERIAL NUMBER: 47-2651

MFR/MODEL: CCF-BRILL, C-36

LENGTH: 30'9.5"(9 385 mm)
WIDTH: 7'11.75"(2 432 mm)
HEIGHT: 9'6"(2 896 mm)
WEIGHT: 15,085 lbs.(6 843 kg)

ENGINE: HALL-SCOTT 136, 6-CYL.
HORSEPOWER: 150(112 kW)
FUEL: GASOLINE
SEATING: 36

ORDERED: 12/1947
DELIVERY: 1/1948
REMARKS: SOLD

WITHDRAWN: 1968
DISPOSAL: 11/1968

BUS NUMBER: 37
SERIAL NUMBER: 47-2652

MFR/MODEL: CCF-BRILL, C-36

LENGTH: 30'9.5"(9 385 mm)
WIDTH: 7'11.75"(2 432 mm)
HEIGHT: 9'6"(2 896 mm)
WEIGHT: 15,085 lbs.(6 843 kg)

ENGINE: HALL-SCOTT 136, 6-CYL.
HORSEPOWER: 150(112 kW)
FUEL: GASOLINE
SEATING: 36

ORDERED: 12/1947
DELIVERY: 1/1948
REMARKS: PRESERVED BY ETS

WITHDRAWN: 1968
DISPOSAL: N/A

BUS NUMBER: 38-40
SERIAL NUMBER: 48-2719 - 48-2721

MFR/MODEL: CCF-BRILL, C-36

LENGTH: 30'9.5"(9 385 mm)
WIDTH: 7'11.75"(2 432 mm)
HEIGHT: 9'6"(2 896 mm)
WEIGHT: 15,085 lbs.(6 843 kg)

ENGINE: HALL-SCOTT 136, 6-CYL.
HORSEPOWER: 150(112 kW)
FUEL: GASOLINE
SEATING: 36

ORDERED: 12/1947
DELIVERY: 1948
REMARKS: SOLD

WITHDRAWN: 1967-1969
DISPOSAL: 1967-1970

BUS NUMBER: 41-42
SERIAL NUMBER: 48-2764, 48-2765

MFR/MODEL: CCF-BRILL, C-36

LENGTH: 30'9.5"(9 385 mm)
WIDTH: 7'11.75"(2 432 mm)
HEIGHT: 9'6"(2 896 mm)
WEIGHT: 15,085 lbs.(6 843 kg)

ENGINE: HALL-SCOTT 136, 6-CYL.
HORSEPOWER: 150(112 kW)
FUEL: GASOLINE
SEATING: 36

ORDERED: 1948
DELIVERY: 10/1948
REMARKS: SOLD

WITHDRAWN: 1969
DISPOSAL: 1969

BUS NUMBER: 43
SERIAL NUMBER: 48-2766

MFR/MODEL: CCF-BRILL, C-36

LENGTH: 30'9.5"(9 385 mm)
WIDTH: 7'11.75"(2 432 mm)
HEIGHT: 9'6"(2 896 mm)
WEIGHT: 15,085 lbs.(6 843 kg)

ENGINE: HALL-SCOTT 136, 6-CYL.
HORSEPOWER: 150(112 kW)
FUEL: GASOLINE
SEATING: 36

ORDERED: 1948
DELIVERY: 10/1948
WITHDRAWN: 1969
DISPOSAL: 1969
REMARKS: RENUMBERED 99, PRESERVED BY ETS

BUS NUMBER: 44-45
SERIAL NUMBER: 48-2767, 48-2768

MFR/MODEL: CCF-BRILL, C-36

LENGTH: 30'9.5"(9 385 mm)
WIDTH: 7'11.75"(2 432 mm)
HEIGHT: 9'6"(2 896 mm)
WEIGHT: 15,085 lbs.(6 843 kg)

ENGINE: HALL-SCOTT 136, 6-CYL.
HORSEPOWER: 150(112 kW)
FUEL: GASOLINE
SEATING: 36

ORDERED: 1948
DELIVERY: 10/1948
REMARKS: SOLD

WITHDRAWN: 1969
DISPOSAL: 1969

BUS NUMBER: 46-53
SERIAL NUMBER: 50-2879 - 50-2886

MFR/MODEL: CCF-BRILL, C-36

LENGTH: 30'9.5"(9 385 mm)
WIDTH: 7'11.75"(2 432 mm)
HEIGHT: 9'6"(2 896 mm)
WEIGHT: 15,085 lbs.(6 843 kg)

ENGINE: HALL-SCOTT 136, 6-CYL.
HORSEPOWER: 150(112 kW)
FUEL: GASOLINE
SEATING: 36

ORDERED: 1/1950
DELIVERY: 3/1950
REMARKS: SOLD

WITHDRAWN: 1969
DISPOSAL: 1969-1971

BUS NUMBER: 54-58
SERIAL NUMBER: 652-C - 656-C

MFR/MODEL: TWIN COACH, 44S

LENGTH: 34'10"(10 617 mm)
WIDTH: 7'11.8"(2 433 mm)
HEIGHT: 9'4.5"(2 858 mm)
WEIGHT: 15,000 lbs.(6 804 kg)

ENGINE: FTC 180
HORSEPOWER: 175(130.6 kW)
FUEL: GASOLINE
SEATING: 44

ORDERED: 1/1950
DELIVERY: 6-7/1950
REMARKS: SOLD OR SCRAPPED

WITHDRAWN: 1972-1975
DISPOSAL: 1972-1976

BUS NUMBER: 59 | SERIAL NUMBER: 657-C

MFR/MODEL: TWIN COACH, 44S

LENGTH: 34'10"(10 617 mm) | ENGINE: FTC 180
WIDTH: 7'11.8"(2 433 mm) | HORSEPOWER: 180(134.3 kW)
HEIGHT: 9'4.5"(2 858 mm) | FUEL: PROPANE
WEIGHT: 15,000 lbs.(6 804 kg) | SEATING: 44

ORDERED: 1/1950 | WITHDRAWN: 1975
DELIVERY: 7/1950 | DISPOSAL: N/A
REMARKS: CONVERTED TO PROPANE AT FACTORY; PRESERVED BY ETS

BUS NUMBER: 60-69 | SERIAL NUMBER: 96-C - 105-C

MFR/MODEL: TWIN COACH, 45S

LENGTH: 34'10"(10 617 mm) | ENGINE: FTC 210
WIDTH: 7'11.8"(2 443 mm) | HORSEPOWER: 210(156.6 kW)
HEIGHT: 9'4.5"(2 858 mm) | FUEL: PROPANE
WEIGHT: 15,500 lbs.(7 031 kg) | SEATING: 45

ORDERED: 8/1950 | WITHDRAWN: 1971-1975
DELIVERY: 12/1950 | DISPOSAL: 1971-1976
REMARKS: SOLD OR SCRAPPED

BUS NUMBER: 70-82 | SERIAL NUMBER: 152-C - 164-C

MFR/MODEL: TWIN COACH, 45S

LENGTH: 34'10"(10 617 mm) | ENGINE: FTC 210
WIDTH: 7'11.8"(2 443 mm) | HORSEPOWER: 210(156.6 kW)
HEIGHT: 9'4.5"(2 858 mm) | FUEL: PROPANE
WEIGHT: 15,500 lbs.(7 031 kg) | SEATING: 45

ORDERED: 12/1950 | WITHDRAWN: 1972-1975
DELIVERY: 4/1951 | DISPOSAL: 1972-1976
REMARKS: SOLD OR SCRAPPED

BUS NUMBER: 83 SERIAL NUMBER: 46-2001

MFR/MODEL: CCF-BRILL, C-36

LENGTH: 30'9.5"(9 385 mm) ENGINE: HALL-SCOTT 136, 6-CYL.
WIDTH: 7'11.75"(2 432 mm) HORSEPOWER: 150(112 kW)
HEIGHT: 9'6"(2 896 mm) FUEL: GASOLINE
WEIGHT: 15,085 lbs.(6 843 kg) SEATING: 36

BUILT: 1946 WITHDRAWN: 1967
DELIVERY: 5/1951 DISPOSAL: 1968
REMARKS: FROM ST. JOHN, N.B., ex 88

BUS NUMBER: 84 SERIAL NUMBER: 46-2002

MFR/MODEL: CCF-BRILL, C-36

LENGTH: 30'9.5"(9 385 mm) ENGINE: HALL-SCOTT 136, 6-CYL.
WIDTH: 7'11.75"(2 432 mm) HORSEPOWER: 150(112 kW)
HEIGHT: 9'6"(2 896 mm) FUEL: GASOLINE
WEIGHT: 15,085 lbs.(6 843 kg) SEATING: 36

BUILT: 1946 WITHDRAWN: 1966
DELIVERY: 5/1951 DISPOSAL: 1967
REMARKS: FROM ST. JOHN, N.B., ex 90

BUS NUMBER: 85 SERIAL NUMBER: 46-2004

MFR/MODEL: CCF-BRILL, C-36

LENGTH: 30'9.5"(9 385 mm) ENGINE: HALL-SCOTT 136, 6-CYL.
WIDTH: 7'11.75"(2 432 mm) HORSEPOWER: 150(112 kW)
HEIGHT: 9'6"(2 896 mm) FUEL: GASOLINE
WEIGHT: 15,085 lbs.(6 843 kg) SEATING: 36

BUILT: 1946 WITHDRAWN: 5/1967
DELIVERY: 5/1951 DISPOSAL: 1967
REMARKS: FROM ST. JOHN, N.B., ex 94

BUS NUMBER: 86
SERIAL NUMBER: 46-2005

MFR/MODEL: CCF-BRILL, C-36

LENGTH: 30'9.5"(9 385 mm)
WIDTH: 7'11.75"(2 432 mm)
HEIGHT: 9'6"(2 896 mm)
WEIGHT: 15,085 lbs.(6 843 kg)
ENGINE: HALL-SCOTT 136, 6-CYL.
HORSEPOWER: 150(112 kW)
FUEL: GASOLINE
SEATING: 36

BUILT: 1946
DELIVERY: 5/1951
WITHDRAWN: 1967
DISPOSAL: 1968
REMARKS: FROM ST. JOHN, N.B., ex 96

BUS NUMBER: 87
SERIAL NUMBER: 46-2006

MFR/MODEL: CCF-BRILL, C-36

LENGTH: 30'9.5"(9 385 mm)
WIDTH: 7'11.75"(2 432 mm)
HEIGHT: 9'6"(2 896 mm)
WEIGHT: 15,085 lbs.(6 843 kg)
ENGINE: HALL-SCOTT 136, 6-CYL.
HORSEPOWER: 150(112 kW)
FUEL: GASOLINE
SEATING: 36

BUILT: 1946
DELIVERY: 5/1951
WITHDRAWN: 11/1966
DISPOSAL: 1967
REMARKS: FROM ST. JOHN, N.B., ex 98

BUS NUMBER: 88
SERIAL NUMBER: 46-2007

MFR/MODEL: CCF-BRILL, C-36

LENGTH: 30'9.5"(9 385 mm)
WIDTH: 7'11.75"(2 432 mm)
HEIGHT: 9'6"(2 896 mm)
WEIGHT: 15,085 lbs.(6 843 kg)
ENGINE: HALL-SCOTT 136, 6-CYL.
HORSEPOWER: 150(112 kW)
FUEL: GASOLINE
SEATING: 36

BUILT: 1946
DELIVERY: 5/1951
WITHDRAWN: 1962
DISPOSAL: 1/1965
REMARKS: FROM ST. JOHN, N.B., ex 100

BUS NUMBER: 89 SERIAL NUMBER: 46-2008

MFR/MODEL: CCF-BRILL, C-36

LENGTH: 30'9.5"(9 385 mm) ENGINE: HALL-SCOTT 136, 6-CYL.
WIDTH: 7'11.75"(2 432 mm) HORSEPOWER: 150(112 kW)
HEIGHT: 9'6"(2 896 mm) FUEL: GASOLINE
WEIGHT: 15,085 lbs.(6 843 kg) SEATING: 36

BUILT: 1946 WITHDRAWN: 11/1966
DELIVERY: 5/1951 DISPOSAL: 1967
REMARKS: FROM ST. JOHN, N.B., ex 102

BUS NUMBER: 90 SERIAL NUMBER: 46-2009

MFR/MODEL: CCF-BRILL, C-36

LENGTH: 30'9.5"(9 385 mm) ENGINE: HALL-SCOTT 136, 6-CYL.
WIDTH: 7'11.75"(2 432 mm) HORSEPOWER: 150(112 kW)
HEIGHT: 9'6"(2 896 mm) FUEL: GASOLINE
WEIGHT: 15,085 lbs.(6 843 kg) SEATING: 36

BUILT: 1946 WITHDRAWN: 1963
DELIVERY: 5/1951 DISPOSAL: 9/1964
REMARKS: FROM ST. JOHN, N.B., ex 104

BUS NUMBER: 91 SERIAL NUMBER: 46-2010

MFR/MODEL: CCF-BRILL, C-36

LENGTH: 30'9.5"(9 385 mm) ENGINE: HALL-SCOTT 136, 6-CYL.
WIDTH: 7'11.75"(2 432 mm) HORSEPOWER: 150(112 kW)
HEIGHT: 9'6"(2 896 mm) FUEL: GASOLINE
WEIGHT: 15,085 lbs.(6 843 kg) SEATING: 36

BUILT: 1946 WITHDRAWN: 1964
DELIVERY: 5/1951 DISPOSAL: 1/1965
REMARKS: FROM ST. JOHN, N.B., ex 106

BUS NUMBER: 92 SERIAL NUMBER: 46-2011

MFR/MODEL: CCF-BRILL, C-36

LENGTH: 30'9.5"(9 385 mm) ENGINE: HALL-SCOTT 136, 6-CYL.
WIDTH: 7'11.75"(2 432 mm) HORSEPOWER: 150(112 kW)
HEIGHT: 9'6"(2 896 mm) FUEL: GASOLINE
WEIGHT: 15,085 lbs.(6 843 kg) SEATING: 36

BUILT: 1946 WITHDRAWN: 1965
DELIVERY: 5/1951 DISPOSAL: 10/1965
REMARKS: FROM ST. JOHN, N.B., ex 108

BUS NUMBER: 93 SERIAL NUMBER: 46-2012

MFR/MODEL: CCF-BRILL, C-36

LENGTH: 30'9.5"(9 385 mm) ENGINE: HALL-SCOTT 136, 6-CYL.
WIDTH: 7'11.75"(2 432 mm) HORSEPOWER: 150(112 kW)
HEIGHT: 9'6"(2 896 mm) FUEL: GASOLINE
WEIGHT: 15,085 lbs.(6 843 kg) SEATING: 36

BUILT: 1946 WITHDRAWN: 1969
DELIVERY: 5/1951 DISPOSAL: 1969
REMARKS: FROM ST. JOHN, N.B., ex 110

BUS NUMBER: 94-99 SERIAL NUMBER: 1296-1301

MFR/MODEL: MACK MANUFACTURING, C-37DT

LENGTH: 35'(10 668 mm) ENGINE: MACK END-672, 6-CYL.
WIDTH: 8'1"(2 464 mm) HORSEPOWER: 57(42.5)
HEIGHT: 9'4"(2 845 mm) FUEL: DIESEL
WEIGHT: 16,200 lbs.(7 348 kg) SEATING: 37

ORDERED: 1951 WITHDRAWN: 1963-1964
DELIVERY: 11/1951 DISPOSAL: 1963-1965
REMARKS: SOLD OR SCRAPPED

BUS NUMBER: 401-408
SERIAL NUMBER: 1-8

MFR/MODEL: TWIN COACH, FLP-40

LENGTH: 40'(12 192 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 9'10"(2 997 mm)
WEIGHT: 17,000 lbs.(7 771 kg)

ENGINE: FTC 210
HORSEPOWER: 210(156.6 kW)
FUEL: PROPANE
SEATING: 52

ORDERED: 4/1951
DELIVERY: 5/1952
REMARKS: SCRAPPED

WITHDRAWN: 1963-1967
DISPOSAL: 1963-1967

BUS NUMBER: 409-418
SERIAL NUMBER: 1401-1410

MFR/MODEL: GMC TDH-5105

LENGTH: 39'9"(12 166 mm)
WIDTH: 8'4.4"(2 550 mm)
HEIGHT: 9'5.25"(1 133 mm)
WEIGHT: 19,350 lbs.(8 777 kg)

ENGINE: GM 6V-71
HORSEPOWER: 188(140 kW)
FUEL: DIESEL
SEATING: 52

ORDERED: 1955
DELIVERY: 9/1955
REMARKS:

WITHDRAWN: 1978
DISPOSAL: 1978

BUS NUMBER: 419-423
SERIAL NUMBER: 2504-2508

MFR/MODEL: GMC TDH-5105

LENGTH: 39'9"(12 166 mm)
WIDTH: 8'4.4"(2 550 mm)
HEIGHT: 9'5.25"(1 133 mm)
WEIGHT: 19,350 lbs.(8 777 kg)

ENGINE: GM 6V-71
HORSEPOWER: 188(140 kW)
FUEL: DIESEL
SEATING: 52

ORDERED: 1956
DELIVERY: 12/1956
REMARKS:

WITHDRAWN: 1978
DISPOSAL: 1978

BUS NUMBER: 424-431
SERIAL NUMBER: 3461-3468

MFR/MODEL: GMC TDH-5105

LENGTH: 39'9"(12 166 mm)
WIDTH: 8'4.4"(2 550 mm)
HEIGHT: 9'5.25"(1 133 mm)
WEIGHT: 19,350 lbs.(8 777 kg)

ENGINE: GM 6V-71
HORSEPOWER: 188(140 kW)
FUEL: DIESEL
SEATING: 52

ORDERED: 5/1958
DELIVERY: 12/1958
REMARKS:

WITHDRAWN: 1978
DISPOSAL: 1978

BUS NUMBER: 432
SERIAL NUMBER: 3469

MFR/MODEL: GMC TDH-5105

LENGTH: 39'9"(12 166 mm)
WIDTH: 8'4.4"(2 550 mm)
HEIGHT: 9'5.25"(1 133 mm)
WEIGHT: 19,350 lbs.(8 777 kg)

ENGINE: GM 6V-71
HORSEPOWER: 188(140 kW)
FUEL: DIESEL
SEATING: 52

ORDERED: 5/1958
DELIVERY: 12/1958
REMARKS: PRESERVED BY ET

WITHDRAWN: 1978
DISPOSAL: N/A

BUS NUMBER: 433
SERIAL NUMBER: 3470

MFR/MODEL: GMC TDH-5105

LENGTH: 39'9"(12 166 mm)
WIDTH: 8'4.4"(2 550 mm)
HEIGHT: 9'5.25"(1 133 mm)
WEIGHT: 19,350 lbs.(8 777 kg)

ENGINE: GM 6V-71
HORSEPOWER: 188(140 kW)
FUEL: DIESEL
SEATING: 52

ORDERED: 5/1958
DELIVERY: 12/1958
REMARKS:

WITHDRAWN: 1978
DISPOSAL: 1979

BUS NUMBER: 434-438
SERIAL NUMBER: 1564-1568

MFR/MODEL: GMC TDH-5301

LENGTH: 40'(12 192 mm)
WIDTH: 9'5.75"(2 889 mm)
HEIGHT: 9'10"(2 997 mm)
WEIGHT: 20,000 lbs.(9 072 kg)

ENGINE: GM 6V-71
HORSEPOWER: 188(140 kW)
FUEL: DIESEL
SEATING: 51

ORDERED: 1960
DELIVERY: 1960
REMARKS:

WITHDRAWN:
DISPOSAL:

BUS NUMBER: 801
SERIAL NUMBER:

MFR/MODEL: ONEIDA SCHOOL BUS

LENGTH:
WIDTH:
HEIGHT:
WEIGHT:

ENGINE:
HORSEPOWER:
FUEL: GASOLINE
SEATING: 48

ORDERED:
DELIVERY: 1961
REMARKS: TRADED-IN

WITHDRAWN: 1963
DISPOSAL: 1963

BUS NUMBER: 802
SERIAL NUMBER:

MFR/MODEL: ONEIDA SCHOOL BUS

LENGTH:
WIDTH:
HEIGHT:
WEIGHT:

ENGINE:
HORSEPOWER:
FUEL: GASOLINE
SEATING: 48

ORDERED:
DELIVERY: 1961
REMARKS: TRADED-IN

WITHDRAWN: 1963
DISPOSAL: 1963

BUS NUMBER: 803 SERIAL NUMBER:

MFR/MODEL: ONEIDA SCHOOL BUS

LENGTH: ENGINE:
WIDTH: HORSEPOWER:
HEIGHT: FUEL: GASOLINE
WEIGHT: SEATING: 48

ORDERED: WITHDRAWN: 1966
DELIVERY: 1961 DISPOSAL: 8/1966
REMARKS: SOLD

BUS NUMBER: 804 SERIAL NUMBER:

MFR/MODEL: CARPENTER SCHOOL BUS

LENGTH: ENGINE: IHC
WIDTH: HORSEPOWER:
HEIGHT: FUEL: GASOLINE
WEIGHT: SEATING: 54

ORDERED: WITHDRAWN: 1966
DELIVERY: 1961 DISPOSAL: 8/1966
REMARKS: SOLD

BUS NUMBER: 805 SERIAL NUMBER:

MFR/MODEL: CARPENTER SCHOOL BUS

LENGTH: ENGINE: IHC
WIDTH: HORSEPOWER:
HEIGHT: FUEL: GASOLINE
WEIGHT: SEATING: 54

ORDERED: WITHDRAWN: 1968
DELIVERY: 1961 DISPOSAL: 2/1969
REMARKS: SOLD

BUS NUMBER: 830-833
SERIAL NUMBER: 1658-1661

MFR/MODEL: BLUEBIRD SCHOOL BUS

LENGTH:
WIDTH:
HEIGHT:
WEIGHT:

ENGINE:
HORSEPOWER:
FUEL: GASOLINE
SEATING: 72

ORDERED:
DELIVERY: 3/1962
REMARKS:

WITHDRAWN:
DISPOSAL:

BUS NUMBER: 834
SERIAL NUMBER:

MFR/MODEL: SUPERIOR SCHOOL BUS

LENGTH:
WIDTH:
HEIGHT:
WEIGHT:

ENGINE:
HORSEPOWER:
FUEL: GASOLINE
SEATING: 72

ORDERED:
DELIVERY: 1962
REMARKS: SOLD

WITHDRAWN: 1969
DISPOSAL: 4/1969

BUS NUMBER: 835
SERIAL NUMBER:

MFR/MODEL: CARPENTER SCHOOL BUS

LENGTH: 34'(10 363 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 10'1"(3 073 mm)
WEIGHT:

ENGINE: IHC
HORSEPOWER:
FUEL: GASOLINE
SEATING: 72

ORDERED:
DELIVERY: 9/1962
REMARKS: SOLD

WITHDRAWN: 1970
DISPOSAL: 8/1970

BUS NUMBER: 836 SERIAL NUMBER:

MFR/MODEL: CARPENTER SCHOOL BUS

LENGTH: 34'(10 363 mm) ENGINE: IHC
WIDTH: 8'(2 438 mm) HORSEPOWER:
HEIGHT: 10'1"(3 073 mm) FUEL: GASOLINE
WEIGHT: SEATING: 72

ORDERED: WITHDRAWN: 1970
DELIVERY: 9/1962 DISPOSAL: 8/1970
REMARKS: SOLD

BUS NUMBER: 837 SERIAL NUMBER:

MFR/MODEL: CARPENTER SCHOOL BUS

LENGTH: 34'(10 363 mm) ENGINE: IHC
WIDTH: 8'(2 438 mm) HORSEPOWER:
HEIGHT: 10'1"(3 073 mm) FUEL: GASOLINE
WEIGHT: SEATING: 72

ORDERED: WITHDRAWN: 1970
DELIVERY: 9/1962 DISPOSAL: 8/1970
REMARKS: SOLD

BUS NUMBER: 838 SERIAL NUMBER: FD14668

MFR/MODEL: CARPENTER SCHOOL BUS

LENGTH: 34'(10 363 mm) ENGINE: IHC
WIDTH: 8'(2 438 mm) HORSEPOWER:
HEIGHT: 10'1"(3 073 mm) FUEL: GASOLINE
WEIGHT: SEATING: 72

ORDERED: WITHDRAWN:
DELIVERY: 9/1962 DISPOSAL:
REMARKS:

BUS NUMBER: 839
SERIAL NUMBER: FD14665

MFR/MODEL: CARPENTER SCHOOL BUS

LENGTH: 34'(10 363 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 10'1"(3 073 mm)
WEIGHT:

ENGINE: IHC
HORSEPOWER:
FUEL: GASOLINE
SEATING: 72

ORDERED:
DELIVERY: 9/1962
REMARKS:

WITHDRAWN:
DISPOSAL:

BUS NUMBER: 840
SERIAL NUMBER: FD14701

MFR/MODEL: CARPENTER SCHOOL BUS

LENGTH: 34'(10 363 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 10'1"(3 073 mm)
WEIGHT:

ENGINE: IHC
HORSEPOWER:
FUEL: GASOLINE
SEATING: 72

ORDERED:
DELIVERY: 9/1962
REMARKS:

WITHDRAWN: 1975
DISPOSAL: 1975

BUS NUMBER: 841
SERIAL NUMBER: FD14790

MFR/MODEL: CARPENTER SCHOOL BUS

LENGTH: 34'(10 363 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 10'1"(3 073 mm)
WEIGHT:

ENGINE: IHC
HORSEPOWER:
FUEL: GASOLINE
SEATING: 72

ORDERED:
DELIVERY: 9/1962
REMARKS:

WITHDRAWN: 1975
DISPOSAL: 1975

BUS NUMBER: 842
SERIAL NUMBER: FD14795

MFR/MODEL: CARPENTER SCHOOL BUS

LENGTH: 34'(10 363 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 10'1"(3 073 mm)
WEIGHT:

ENGINE: IHC
HORSEPOWER:
FUEL: GASOLINE
SEATING: 72

ORDERED:
DELIVERY: 9/1962
REMARKS:

WITHDRAWN: 1975
DISPOSAL: 1975

BUS NUMBER: 843
SERIAL NUMBER: FD14784

MFR/MODEL: CARPENTER SCHOOL BUS

LENGTH: 34'(10 363 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 10'1"(3 073 mm)
WEIGHT:

ENGINE: IHC
HORSEPOWER:
FUEL: GASOLINE
SEATING: 72

ORDERED:
DELIVERY: 9/1962
REMARKS:

WITHDRAWN: 1975
DISPOSAL: 1975

BUS NUMBER: 844
SERIAL NUMBER: FD14801

MFR/MODEL: CARPENTER SCHOOL BUS

LENGTH: 34'(10 363 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 10'1"(3 073 mm)
WEIGHT:

ENGINE: IHC
HORSEPOWER:
FUEL: GASOLINE
SEATING: 72

ORDERED:
DELIVERY: 9/1962
REMARKS:

WITHDRAWN: 1975
DISPOSAL: 1975

BUS NUMBER: 439-443
SERIAL NUMBER: C080-C084

MFR/MODEL: GMC TDH-5301

LENGTH: 40'(12 192 mm)
WIDTH: 9'5.75"(2 889 mm)
HEIGHT: 9'10"(2 997 mm)
WEIGHT: 20,000 lbs.(9 072 kg)

ENGINE: GM 6V-71
HORSEPOWER: 188(140 kW)
FUEL: DIESEL
SEATING: 51

ORDERED:
DELIVERY: 1962
REMARKS:

WITHDRAWN:
DISPOSAL:

BUS NUMBER: 501
SERIAL NUMBER:

MFR/MODEL: TWIN COACH 41S

LENGTH: 32'10"(10 008 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 9'(2 743 mm)
WEIGHT: 24,000 lbs.(10 886 kg

ENGINE: FTC-180
HORSEPOWER: 180(134 kW)
FUEL: GASOLINE
SEATING: 41

BUILT: 1947
DELIVERY: 11/1962

WITHDRAWN: 1968
DISPOSAL: 4/1969

REMARKS: EX WINNIPEG 851; RENUMBERED 1, 9/1966

BUS NUMBER: 502
SERIAL NUMBER:

MFR/MODEL: TWIN COACH 41S

LENGTH: 32'10"(10 008 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 9'(2 743 mm)
WEIGHT: 24,000 lbs.(10 886 kg

ENGINE: FTC-180
HORSEPOWER: 180(134 kW)
FUEL: GASOLINE
SEATING: 41

BUILT: 1947
DELIVERY: 11/1962

WITHDRAWN: 1968
DISPOSAL:

REMARKS: EX WINNIPEG 853, RENUMBERED 2, 9/1966

BUS NUMBER: 503 SERIAL NUMBER:

MFR/MODEL: TWIN COACH 41S

LENGTH: 32'10"(10 008 mm) ENGINE: FTC-180
WIDTH: 8'(2 438 mm) HORSEPOWER: 180(134 kW)
HEIGHT: 9'(2 743 mm) FUEL: GASOLINE
WEIGHT: 24,000 lbs.(10 886 kg SEATING: 41

BUILT: 1947 WITHDRAWN: 1968
DELIVERY: 11/1962 DISPOSAL: 11/1968
REMARKS: EX WINNIPEG 855, RENUMBERED 3, 9/1966

BUS NUMBER: 504 SERIAL NUMBER:

MFR/MODEL: TWIN COACH 41S

LENGTH: 32'10"(10 008 mm) ENGINE: FTC-180
WIDTH: 8'(2 438 mm) HORSEPOWER: 180(134 kW)
HEIGHT: 9'(2 743 mm) FUEL: GASOLINE
WEIGHT: 24,000 lbs.(10 886 kg SEATING: 41

BUILT: 1947 WITHDRAWN: 1968
DELIVERY: 11/1962 DISPOSAL: 1969
REMARKS: EX WINNIPEG 857, RENUMBERED 4, 9/1966

BUS NUMBER: 505 SERIAL NUMBER:

MFR/MODEL: TWIN COACH 41S

LENGTH: 32'10"(10 008 mm) ENGINE: FTC-180
WIDTH: 8'(2 438 mm) HORSEPOWER: 180(134 kW)
HEIGHT: 9'(2 743 mm) FUEL: GASOLINE
WEIGHT: 24,000 lbs.(10 886 kg SEATING: 41

BUILT: 1947 WITHDRAWN: 1968
DELIVERY: 11/1962 DISPOSAL: 1969
REMARKS: EX WINNIPEG 859, RENUMBERED 5, 9/1966

BUS NUMBER: 506 SERIAL NUMBER:

MFR/MODEL: TWIN COACH 41S

LENGTH: 32'10"(10 008 mm)	ENGINE: FTC-180
WIDTH: 8'(2 438 mm)	HORSEPOWER: 180(134 kW)
HEIGHT: 9'(2 743 mm)	FUEL: GASOLINE
WEIGHT: 24,000 lbs.(10 886 kg	SEATING: 41

BUILT: 1947	WITHDRAWN: 1968
DELIVERY: 11/1962	DISPOSAL: 1969

REMARKS: EX WINNIPEG 861, RENUMBERED 6, 9/1966

BUS NUMBER: 507 SERIAL NUMBER:

MFR/MODEL: TWIN COACH 41S

LENGTH: 32'10"(10 008 mm)	ENGINE: FTC-180
WIDTH: 8'(2 438 mm)	HORSEPOWER: 180(134 kW)
HEIGHT: 9'(2 743 mm)	FUEL: GASOLINE
WEIGHT: 24,000 lbs.(10 886 kg	SEATING: 41

BUILT: 1947	WITHDRAWN: 1968
DELIVERY: 11/1962	DISPOSAL: 1969

REMARKS: EX WINNIPEG 863, RENUMBERED 7, 9/1966

BUS NUMBER: 508 SERIAL NUMBER:

MFR/MODEL: TWIN COACH 41S

LENGTH: 32'10"(10 008 mm)	ENGINE: FTC-180
WIDTH: 8'(2 438 mm)	HORSEPOWER: 180(134 kW)
HEIGHT: 9'(2 743 mm)	FUEL: GASOLINE
WEIGHT: 24,000 lbs.(10 886 kg	SEATING: 41

BUILT: 1947	WITHDRAWN: 1968
DELIVERY: 11/1962	DISPOSAL: 12/1975

REMARKS: EX WINNIPEG 865, RENUMBERED 8, 9/1966

BUS NUMBER: 509 SERIAL NUMBER:

MFR/MODEL: TWIN COACH 41S

LENGTH: 32'10"(10 008 mm) ENGINE: FTC-180
WIDTH: 8'(2 438 mm) HORSEPOWER: 180(134 kW)
HEIGHT: 9'(2 743 mm) FUEL: GASOLINE
WEIGHT: 24,000 lbs.(10 886 kg SEATING: 41

BUILT: 1947 WITHDRAWN: 1966
DELIVERY: 11/1962 DISPOSAL: 11/1966
REMARKS: EX WINNIPEG 867; RENUMBERED 9, 9/1966

BUS NUMBER: 510 SERIAL NUMBER:

MFR/MODEL: TWIN COACH 41S

LENGTH: 32'10"(10 008 mm) ENGINE: FTC-180
WIDTH: 8'(2 438 mm) HORSEPOWER: 180(134 kW)
HEIGHT: 9'(2 743 mm) FUEL: GASOLINE
WEIGHT: 24,000 lbs.(10 886 kg SEATING: 41

BUILT: 1947 WITHDRAWN: 1966
DELIVERY: 11/1962 DISPOSAL: 7/1966
REMARKS: EX WINNIPEG 869

BUS NUMBER: 511 SERIAL NUMBER:

MFR/MODEL: TWIN COACH 38S

LENGTH: 31'(9 449 mm) ENGINE: FTC-180
WIDTH: 8'(2 438 mm) HORSEPOWER: 180(134 kW)
HEIGHT: 9'(2 743 mm) FUEL: GASOLINE
WEIGHT: 24,000 lbs.(10 886 kg SEATING: 38

BUILT: 1946 WITHDRAWN: 1966
DELIVERY: 11/1962 DISPOSAL: 5/1966
REMARKS: EX WINNIPEG 813

BUS NUMBER: 512 SERIAL NUMBER:

MFR/MODEL: TWIN COACH 38S

LENGTH: 31'(9 449 mm) ENGINE: FTC-180
WIDTH: 8'(2 438 mm) HORSEPOWER: 180(134 kW)
HEIGHT: 9'(2 743 mm) FUEL: GASOLINE
WEIGHT: 24,000 lbs.(10 886 kg SEATING: 38

BUILT: 1946 WITHDRAWN: 1967
DELIVERY: 11/1962 DISPOSAL: 4/1967
REMARKS: EX WINNIPEG 815; RENUMBERED 11, 9/1966

BUS NUMBER: 513 SERIAL NUMBER:

MFR/MODEL: TWIN COACH 38S

LENGTH: 31'(9 449 mm) ENGINE: FTC-180
WIDTH: 8'(2 438 mm) HORSEPOWER: 180(134 kW)
HEIGHT: 9'(2 743 mm) FUEL: GASOLINE
WEIGHT: 24,000 lbs.(10 886 kg SEATING: 38

BUILT: 1946 WITHDRAWN: 1967
DELIVERY: 11/1962 DISPOSAL: 1/1970
REMARKS: EX WINNIPEG 817; RENUMBERED 12, 9/1966

BUS NUMBER: 514 SERIAL NUMBER:

MFR/MODEL: TWIN COACH 38S

LENGTH: 31'(9 449 mm) ENGINE: FTC-180
WIDTH: 8'(2 438 mm) HORSEPOWER: 180(134 kW)
HEIGHT: 9'(2 743 mm) FUEL: GASOLINE
WEIGHT: 24,000 lbs.(10 886 kg SEATING: 38

BUILT: 1946 WITHDRAWN: 1966
DELIVERY: 11/1962 DISPOSAL: 5/1966
REMARKS: EX WINNIPEG 819

BUS NUMBER: 515
SERIAL NUMBER: 913C

MFR/MODEL: TWIN COACH 38S

LENGTH: 31'(9 449 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 9'(2 743 mm)
WEIGHT: 24,000 lbs.(10 886 kg

ENGINE: FTC-180
HORSEPOWER: 180(134 kW)
FUEL: GASOLINE
SEATING: 38

BUILT: 1948
DELIVERY: 11/1962
REMARKS: EX WINNIPEG 821

WITHDRAWN: 1965
DISPOSAL: 2/1966

BUS NUMBER: 516
SERIAL NUMBER: 914C

MFR/MODEL: TWIN COACH 38S

LENGTH: 31'(9 449 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 9'(2 743 mm)
WEIGHT: 24,000 lbs.(10 886 kg

ENGINE: FTC-180
HORSEPOWER: 180(134 kW)
FUEL: GASOLINE
SEATING: 38

BUILT: 1948
DELIVERY: 11/1962
REMARKS: EX WINNIPEG 823; RENUMBERED 13, 9/1966

WITHDRAWN: 1967
DISPOSAL: 9/1969

BUS NUMBER: 517
SERIAL NUMBER: 915C

MFR/MODEL: TWIN COACH 38S

LENGTH: 31'(9 449 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 9'(2 743 mm)
WEIGHT: 24,000 lbs.(10 886 kg

ENGINE: FTC-180
HORSEPOWER: 180(134 kW)
FUEL: GASOLINE
SEATING: 38

BUILT: 1948
DELIVERY: 11/1962
REMARKS: EX WINNIPEG 825

WITHDRAWN: 1965
DISPOSAL: 2/1966

BUS NUMBER: 518
SERIAL NUMBER: 916C

MFR/MODEL: TWIN COACH 38S

LENGTH: 31'(9 449 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 9'(2 743 mm)
WEIGHT: 24,000 lbs.(10 886 kg

ENGINE: FTC-180
HORSEPOWER: 180(134 kW)
FUEL: GASOLINE
SEATING: 38

BUILT: 1948
DELIVERY: 11/1962
REMARKS: EX WINNIPEG 827

WITHDRAWN: 1965
DISPOSAL: 2/1966

BUS NUMBER: 519
SERIAL NUMBER: 917C

MFR/MODEL: TWIN COACH 38S

LENGTH: 31'(9 449 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 9'(2 743 mm)
WEIGHT: 24,000 lbs.(10 886 kg

ENGINE: FTC-180
HORSEPOWER: 180(134 kW)
FUEL: GASOLINE
SEATING: 38

BUILT: 1948
DELIVERY: 11/1962

WITHDRAWN: 1967
DISPOSAL: 4/1967

REMARKS: EX WINNIPEG 829; RENUMBERED 14, 9/1966

BUS NUMBER: 520
SERIAL NUMBER: 918C

MFR/MODEL: TWIN COACH 38S

LENGTH: 31'(9 449 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 9'(2 743 mm)
WEIGHT: 24,000 lbs.(10 886 kg

ENGINE: FTC-180
HORSEPOWER: 180(134 kW)
FUEL: GASOLINE
SEATING: 38

BUILT: 1948
DELIVERY: 11/1962
REMARKS: EX WINNIPEG 831

WITHDRAWN: 1966
DISPOSAL: 1966

BUS NUMBER: 444 SERIAL NUMBER: C134

MFR/MODEL: GMC TDH-5301

LENGTH: 40'(12 192 mm) ENGINE: GM 6V-71
WIDTH: 9'5.75"(2 889 mm) HORSEPOWER: 188(140 kW)
HEIGHT: 9'10"(2 997 mm) FUEL: DIESEL
WEIGHT: .20,000 lbs.(9 072 kg) SEATING: 51

ORDERED: 1962 WITHDRAWN:
DELIVERY: 1/1963 DISPOSAL:
REMARKS:

BUS NUMBER: (445) SERIAL NUMBER: C135

MFR/MODEL: GMC TDH-5301

LENGTH: 40'(12 192 mm) ENGINE: GM 6V-71
WIDTH: 9'5.75"(2 889 mm) HORSEPOWER: 188(140 kW)
HEIGHT: 9'10"(2 997 mm) FUEL: DIESEL
WEIGHT: 20,000 lbs.(9 072 kg) SEATING: 51

ORDERED: 1962 WITHDRAWN: 1962
DELIVERY: 1/1963 DISPOSAL: 1962
REMARKS: ARRIVED DAMAGED, SOLD TO CALGARY, NOW 551

BUS NUMBER: 446-448 SERIAL NUMBER: C136-C138

MFR/MODEL: GMC TDH-5301

LENGTH: 40'(12 192 mm) ENGINE: GM 6V-71
WIDTH: 9'5.75"(2 889 mm) HORSEPOWER: 188(140 kW)
HEIGHT: 9'10"(2 997 mm) FUEL: DIESEL
WEIGHT: 20,000 lbs.(9 072 kg) SEATING: 51

ORDERED: 1962 WITHDRAWN:
DELIVERY: 1-2/1963 DISPOSAL:
REMARKS:

BUS NUMBER: 449-473 SERIAL NUMBER: C142-C166

MFR/MODEL: GMC TDH-5301

LENGTH: 40'(12 192 mm) ENGINE: GM 6V-71
WIDTH: 9'5.75"(2 889 mm) HORSEPOWER: 188(140 kW)
HEIGHT: 9'10"(2 997 mm) FUEL: DIESEL
WEIGHT: 20,000 lbs.(9 072 kg) SEATING: 51

ORDERED: 1962 WITHDRAWN:
DELIVERY: 2/1963 DISPOSAL:
REMARKS:

BUS NUMBER: 845 SERIAL NUMBER: FD40654

MFR/MODEL: CARPENTER SCHOOL BUS

LENGTH: 34'(10 363 mm) ENGINE: IHC
WIDTH: 8'(2 438 mm) HORSEPOWER:
HEIGHT: 10'1"(3 073 mm) FUEL: GASOLINE
WEIGHT: SEATING: 72

ORDERED: 1963 WITHDRAWN:
DELIVERY: 10/1963 DISPOSAL:
REMARKS:

BUS NUMBER: 846 SERIAL NUMBER: FD41072

MFR/MODEL: CARPENTER SCHOOL BUS

LENGTH: 34'(10 363 mm) ENGINE: IHC
WIDTH: 8'(2 438 mm) HORSEPOWER:
HEIGHT: 10'1"(3 073 mm) FUEL: GASOLINE
WEIGHT: SEATING: 72

ORDERED: 1963 WITHDRAWN:
DELIVERY: 10/1963 DISPOSAL:
REMARKS:

BUS NUMBER: 847 SERIAL NUMBER: FD41092

MFR/MODEL: CARPENTER SCHOOL BUS

LENGTH: 34'(10 363 mm) ENGINE: IHC
WIDTH: 8'(2 438 mm) HORSEPOWER:
HEIGHT: 10'1"(3 073 mm) FUEL: GASOLINE
WEIGHT: SEATING: 72

ORDERED: 1963 WITHDRAWN:
DELIVERY: 10/1963 DISPOSAL:
REMARKS:

BUS NUMBER: 848 SERIAL NUMBER: FD40539

MFR/MODEL: CARPENTER SCHOOL BUS

LENGTH: 34'(10 363 mm) ENGINE: IHC
WIDTH: 8'(2 438 mm) HORSEPOWER:
HEIGHT: 10'1"(3 073 mm) FUEL: GASOLINE
WEIGHT: SEATING: 72

ORDERED: 1963 WITHDRAWN:
DELIVERY: 10/1963 DISPOSAL:
REMARKS:

BUS NUMBER: 849 SERIAL NUMBER: FD40518

MFR/MODEL: CARPENTER SCHOOL BUS

LENGTH: 34'(10 363 mm) ENGINE: IHC
WIDTH: 8'(2 438 mm) HORSEPOWER:
HEIGHT: 10'1"(3 073 mm) FUEL: GASOLINE
WEIGHT: SEATING: 72

ORDERED: 1963 WITHDRAWN:
DELIVERY: 10/1963 DISPOSAL:
REMARKS:

BUS NUMBER: 850-853
SERIAL NUMBER: CBB2031-CBB2034

MFR/MODEL: BLUEBIRD SCHOOL BUS

LENGTH: 34'(10 363 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 10'1"(3 073 mm)
WEIGHT:

ENGINE: CHEVROLET V-8 348A
HORSEPOWER:
FUEL: GASOLINE
SEATING: 67

ORDERED:
DELIVERY: 9&10/1963
REMARKS: SOLD

WITHDRAWN: 1975
DISPOSAL: 1/1976

BUS NUMBER: 854
SERIAL NUMBER: CBB2035

MFR/MODEL: BLUEBIRD TRANSIT BUS

LENGTH: 34'(10 363 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 10'1"(3 073 mm)
WEIGHT:

ENGINE: CHEVROLET V-8 348A
HORSEPOWER:
FUEL: GASOLINE
SEATING: 67

ORDERED:
DELIVERY: 10/1963
REMARKS:

WITHDRAWN: 1971
DISPOSAL: 11/1971

BUS NUMBER: 474-493
SERIAL NUMBER: C170-C189

MFR/MODEL: GMC TDH5303

LENGTH: 40'4"(12 294 mm)
WIDTH: 9'5.75"(2 889 mm)
HEIGHT: 9'10"(2 997 mm)
WEIGHT: 21,500 lbs.(9 752 kg)

ENGINE: GM 6V-71
HORSEPOWER: 188(140 kW)
FUEL: DIESEL
SEATING: 52

ORDERED: 1963
DELIVERY: 1964
REMARKS:

WITHDRAWN:
DISPOSAL:

BUS NUMBER: 10/2nd SERIAL NUMBER: 00092

MFR/MODEL: MITSUBISHI-FUSO, MAR750L

LENGTH: 39'11.5"(12 179 mm) ENGINE: MITSUBISHI 8DB20A
WIDTH: 8'2"(2 490 mm) HORSEPOWER: 233(174 kW)
HEIGHT: 10'2"(3 100 mm) FUEL: DIESEL
WEIGHT: 22,920 lbs.(10 420 kg SEATING: 51

ORDERED: 1963 WITHDRAWN: 6/1971
DELIVERY: 3/1964 DISPOSAL: 1971
REMARKS: RENUMBERED 600, 1968; SOLD

BUS NUMBER: 601 SERIAL NUMBER: UD21930

MFR/MODEL: NISSAN 6LRA110-K2

LENGTH: 39'11"(12 167 mm) ENGINE: NISSAN UD6
WIDTH: 8'2"(2 490 mm) HORSEPOWER: 236(176 kW)
HEIGHT: 10'3"(3 124 mm) FUEL: DIESEL
WEIGHT: 21,000 lbs.(9 526 kg) SEATING: 48

ORDERED: 4/1964 WITHDRAWN: 1973
DELIVERY: 12/1964 DISPOSAL: 1973
REMARKS: PROTOTYPE

BUS NUMBER: 602 SERIAL NUMBER: UD21931

MFR/MODEL: NISSAN 6LRA110-K2

LENGTH: 39'11"(12 167 mm) ENGINE: NISSAN UD6
WIDTH: 8'2"(2 490 mm) HORSEPOWER: 236(176 kW)
HEIGHT: 10'3"(3 124 mm) FUEL: DIESEL
WEIGHT: 21,000 lbs.(9 526 kg) SEATING: 48

ORDERED: 4/1964 WITHDRAWN: 1973
DELIVERY: 12/1964 DISPOSAL: 1973
REMARKS: PROTOTYPE

BUS NUMBER: 603 | SERIAL NUMBER: UD21932

MFR/MODEL: NISSAN 6LRA110-K2

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'2"(2 490 mm)
HEIGHT: 10'3"(3 124 mm)
WEIGHT: 21,000 lbs.(9 526 kg)

ENGINE: NISSAN UD6
HORSEPOWER: 236(176 kW)
FUEL: DIESEL
SEATING: 48

ORDERED: 4/1964
DELIVERY: 12/1964
REMARKS: PROTOTYPE

WITHDRAWN: 1973
DISPOSAL: 1973

BUS NUMBER: 855-866 | SERIAL NUMBER: CBB2070-CBB2081

MFR/MODEL: BLUEBIRD TRANSIT BUS

LENGTH: 35'3"(11 557 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 16,400 lbs.(7 439 kg)

ENGINE: CHEVROLET V-8 360
HORSEPOWER: 180(134 kW)
FUEL: GASOLINE
SEATING: 45

ORDERED: 4/1964
DELIVERY: 9/1964
REMARKS:

WITHDRAWN: 1977
DISPOSAL: 1977

BUS NUMBER: 867-868 | SERIAL NUMBER: CBB2087-CBB2088

MFR/MODEL: BLUEBIRD TRANSIT BUS

LENGTH: 35'3"(11 557 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 10'3"(3 099 mm)
WEIGHT: 16,400 lbs.(7 439 kg)

ENGINE: CHEVROLET V-8 360
HORSEPOWER: 180(134 kW)
FUEL: GASOLINE
SEATING: 45

ORDERED: 4/1964
DELIVERY: 9/1964
REMARKS:

WITHDRAWN: 1977
DISPOSAL: 1977

BUS NUMBER: 869 SERIAL NUMBER: CBB2083

MFR/MODEL: BLUEBIRD SCHOOL BUS

LENGTH: 35'3"(11 557 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT:

ENGINE: CHEVROLET V-8 348A
HORSEPOWER:
FUEL: GASOLINE
SEATING: 67

ORDERED: 4/1964
DELIVERY: 9/1964
REMARKS: SOLD

WITHDRAWN: 1975
DISPOSAL: 1976

BUS NUMBER: 870 SERIAL NUMBER: CBB2089

MFR/MODEL: BLUEBIRD SCHOOL BUS

LENGTH: 35'3"(11 557 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT:

ENGINE: CHEVROLET V-8 348A
HORSEPOWER:
FUEL: GASOLINE
SEATING: 67

ORDERED:
DELIVERY: 9/1964
REMARKS: SOLD

WITHDRAWN: 1975
DISPOSAL: 1976

BUS NUMBER: 871 SERIAL NUMBER: CBB2084

MFR/MODEL: BLUEBIRD SCHOOL BUS

LENGTH: 35'3"(11 557 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT:

ENGINE: CHEVROLET V-8 348A
HORSEPOWER:
FUEL: GASOLINE
SEATING: 67

ORDERED:
DELIVERY: 9/1964
REMARKS: SOLD

WITHDRAWN: 1975
DISPOSAL: 1976

BUS NUMBER: 872
SERIAL NUMBER: CBB2085

MFR/MODEL: BLUEBIRD SCHOOL BUS

LENGTH: 35'3"(11 557 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT:

ENGINE: CHEVROLET V-8 348A
HORSEPOWER:
FUEL: GASOLINE
SEATING: 67

ORDERED:
DELIVERY: 9/1964
REMARKS: SOLD

WITHDRAWN: 1975
DISPOSAL: 1976

BUS NUMBER: 873
SERIAL NUMBER: CBB2082

MFR/MODEL: BLUEBIRD SCHOOL BUS

LENGTH: 35'3"(11 557 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT:

ENGINE: CHEVROLET V-8 348A
HORSEPOWER:
FUEL: GASOLINE
SEATING: 67

ORDERED:
DELIVERY: 9/1964
REMARKS: SOLD

WITHDRAWN: 1975
DISPOSAL: 1976

BUS NUMBER: 874
SERIAL NUMBER: CBB2086

MFR/MODEL: BLUEBIRD SCHOOL BUS

LENGTH: 35'3"(11 557 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT:

ENGINE: CHEVROLET V-8 348A
HORSEPOWER:
FUEL: GASOLINE
SEATING: 67

ORDERED:
DELIVERY: 9/1964
REMARKS: SOLD

WITHDRAWN: 1975
DISPOSAL: 1976

BUS NUMBER: 604-613 SERIAL NUMBER: UD0029-UD0038

MFR/MODEL: NISSAN 6RLA110-K2

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'2"(2 490 mm)
HEIGHT: 10'3"(3 124 mm)
WEIGHT: 21,000 lbs.(9 571 kg)

ENGINE: NISSAN UD6
HORSEPOWER: 236(176 kW)
FUEL: DIESEL
SEATING: 46

ORDERED: 12/1964
DELIVERY: 2-3/1966
REMARKS:

WITHDRAWN: 1974
DISPOSAL: 1974-1975

BUS NUMBER: 701 SERIAL NUMBER: 36004

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

ENGINE: CUMMINS V6-200
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING: 44

ORDERED: 9/1964
DELIVERY: 4/1966
REMARKS: PROTOTYPE

WITHDRAWN: 1973
DISPOSAL: 1973

BUS NUMBER: 702 SERIAL NUMBER: 36008

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

ENGINE: CUMMINS V6-200
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING: 44

ORDERED: 9/1964
DELIVERY: 8/1966
REMARKS: PROTOTYPE

WITHDRAWN: 1973
DISPOSAL: 6/1975

BUS NUMBER: 703 SERIAL NUMBER: 36006

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm) ENGINE: CUMMINS V6-200
WIDTH: 8'2"(2 489 mm) HORSEPOWER: 192(143 kW)
HEIGHT: 10'2"(3 099 mm) FUEL: DIESEL
WEIGHT: 21,100 lbs.(9 571 kg) SEATING: 44

ORDERED: 9/1964 WITHDRAWN: 1973
DELIVERY: 9/1966 DISPOSAL: 2/1976
REMARKS: PROTOTYPE

BUS NUMBER: 704 SERIAL NUMBER: 36026

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm) ENGINE: CUMMINS V6-200
WIDTH: 8'2"(2 489 mm) HORSEPOWER: 192(143 kW)
HEIGHT: 10'2"(3 099 mm) FUEL: DIESEL
WEIGHT: 21,100 lbs.(9 571 kg) SEATING: 44

ORDERED: 12/1964 WITHDRAWN: 8/1974
DELIVERY: 2/1967 DISPOSAL: 6/1975
REMARKS:

BUS NUMBER: 705 SERIAL NUMBER: 36027

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm) ENGINE: CUMMINS V6-200
WIDTH: 8'2"(2 489 mm) HORSEPOWER: 192(143 kW)
HEIGHT: 10'2"(3 099 mm) FUEL: DIESEL
WEIGHT: 21,100 lbs.(9 571 kg) SEATING: 44

ORDERED: 12/1964 WITHDRAWN: 8/1974
DELIVERY: 2/1967 DISPOSAL: 6/1975
REMARKS:

BUS NUMBER: 706 SERIAL NUMBER: 36028

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

ENGINE: CUMMINS V6-200
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING: 44

ORDERED: 12/1964
DELIVERY: 8/1967
REMARKS:

WITHDRAWN: 1974
DISPOSAL: 8/1975

BUS NUMBER: 707 SERIAL NUMBER: 36029

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

ENGINE: CUMMINS V6-200
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING: 44

ORDERED: 12/1964
DELIVERY: 10/1967
REMARKS: NOW INFOBUS, PRESERVED BY ETS

WITHDRAWN: 1974
DISPOSAL: N/A

BUS NUMBER: 708 SERIAL NUMBER: 36030

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

ENGINE: CUMMINS V6-200
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING: 44

ORDERED: 12/1964
DELIVERY: 2/1967
REMARKS:

WITHDRAWN: 1974
DISPOSAL: 2/1976

BUS NUMBER: 709
SERIAL NUMBER: 36031

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

ENGINE: CUMMINS V6-200
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING: 44

ORDERED: 12/1964
DELIVERY: 7/1967
REMARKS:

WITHDRAWN: 1974
DISPOSAL: 2/1976

BUS NUMBER: 710
SERIAL NUMBER: 36032

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

ENGINE: CUMMINS V6-200
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING: 44

ORDERED: 12/1964
DELIVERY: 3/1967
REMARKS:

WITHDRAWN: 1974
DISPOSAL: 2/1976

BUS NUMBER: 711
SERIAL NUMBER: 36033

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

ENGINE: CUMMINS V6-200
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING: 44

ORDERED: 12/1964
DELIVERY: 9/1967
REMARKS:

WITHDRAWN: 8/1974
DISPOSAL: 6/1975

BUS NUMBER: 712
SERIAL NUMBER: 36034

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

ENGINE: CUMMINS V6-200
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING: 44

ORDERED: 12/1964
DELIVERY: 11/1967
REMARKS:

WITHDRAWN: 1974
DISPOSAL:

BUS NUMBER: 713
SERIAL NUMBER: 36035

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

ENGINE: CUMMINS V6-200
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING: 44

ORDERED: 12/1964
DELIVERY: 8/1967
REMARKS:

WITHDRAWN: 1974
DISPOSAL: 2/1976

BUS NUMBER: 714
SERIAL NUMBER: 36036

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

ENGINE: CUMMINS V6-200
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING: 44

ORDERED: 12/1964
DELIVERY: 8/1967
REMARKS:

WITHDRAWN: 1974
DISPOSAL: 2/1976

BUS NUMBER: 715 SERIAL NUMBER: 36037

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

ENGINE: CUMMINS V6-200
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING: 44

ORDERED: 12/1964
DELIVERY: 4/1967
REMARKS:

WITHDRAWN: 1974
DISPOSAL: 2/1976

BUS NUMBER: 716 SERIAL NUMBER: 36038

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

ENGINE: CUMMINS V6-200
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING: 44

ORDERED: 12/1964
DELIVERY: 1/1968
REMARKS:

WITHDRAWN: 1974
DISPOSAL: 2/1976

BUS NUMBER: 717 SERIAL NUMBER: 36039

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

ENGINE: CUMMINS V6-200
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING: 44

ORDERED: 12/1964
DELIVERY: 9/1967
REMARKS:

WITHDRAWN: 1974
DISPOSAL: 8/1975

BUS NUMBER: 718
SERIAL NUMBER: 36040

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

ENGINE: CUMMINS V6-200
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING: 44

ORDERED: 12/1964
DELIVERY: 8/1967
REMARKS:

WITHDRAWN: 1973
DISPOSAL: 1973

BUS NUMBER: 719
SERIAL NUMBER: 36041

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

ENGINE: CUMMINS V6-200
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING: 44

ORDERED: 12/1964
DELIVERY: 10/1968
REMARKS:

WITHDRAWN: 1974
DISPOSAL: 2/1976

BUS NUMBER: 720
SERIAL NUMBER: 36042

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

ENGINE: CUMMINS V6-200
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING: 44

ORDERED: 12/1964
DELIVERY: 9/1967
REMARKS:

WITHDRAWN: 1974
DISPOSAL: 2/1976

BUS NUMBER: 721 SERIAL NUMBER: 36043

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm) ENGINE: CUMMINS V6-200
WIDTH: 8'2"(2 489 mm) HORSEPOWER: 192(143 kW)
HEIGHT: 10'2"(3 099 mm) FUEL: DIESEL
WEIGHT: 21,100 lbs.(9 571 kg) SEATING: 44

ORDERED: 12/1964 WITHDRAWN: 1974
DELIVERY: 1/1968 DISPOSAL: 2/1976
REMARKS:

BUS NUMBER: 722 SERIAL NUMBER: 36044

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm) ENGINE: CUMMINS V6-200
WIDTH: 8'2"(2 489 mm) HORSEPOWER: 192(143 kW)
HEIGHT: 10'2"(3 099 mm) FUEL: DIESEL
WEIGHT: 21,100 lbs.(9 571 kg) SEATING: 44

ORDERED: 12/1964 WITHDRAWN: 8/1974
DELIVERY: 1/1968 DISPOSAL: 6/1975
REMARKS:

BUS NUMBER: 723 SERIAL NUMBER: 36045

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm) ENGINE: CUMMINS V6-200
WIDTH: 8'2"(2 489 mm) HORSEPOWER: 192(143 kW)
HEIGHT: 10'2"(3 099 mm) FUEL: DIESEL
WEIGHT: 21,100 lbs.(9 571 kg) SEATING: 44

ORDERED: 12/1964 WITHDRAWN: 1974
DELIVERY: 8/1967 DISPOSAL: 2/1976
REMARKS:

BUS NUMBER: 724 SERIAL NUMBER: 36046

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

ENGINE: CUMMINS V6-200
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING: 44

ORDERED: 12/1964
DELIVERY: 7/1967
REMARKS:

WITHDRAWN: 1974
DISPOSAL: 2/1976

BUS NUMBER: 725 SERIAL NUMBER: 36047

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

ENGINE: CUMMINS V6-200
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING: 44

ORDERED: 12/1964
DELIVERY: 7/1967
REMARKS:

WITHDRAWN: 8/1974
DISPOSAL: 6/1975

BUS NUMBER: 726 SERIAL NUMBER: 36048

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

ENGINE: CUMMINS V6-200
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING: 44

ORDERED: 12/1964
DELIVERY: 12/1967
REMARKS:

WITHDRAWN: 1974
DISPOSAL: 2/1976

BUS NUMBER: 727 SERIAL NUMBER: 36049

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

ENGINE: CUMMINS V6-200
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING: 44

ORDERED: 12/1964
DELIVERY: 7/1967
REMARKS:

WITHDRAWN: 8/1974
DISPOSAL: 6/1975

BUS NUMBER: 728 SERIAL NUMBER: 36050

MFR/MODEL: CHASSIS-DAIMLER, BODY-DUPLE; SRC6 ROADLINER

LENGTH: 36'4.5"(11 087 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'2"(3 099 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

ENGINE: CUMMINS V6-200
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING: 44

ORDERED: 12/1964
DELIVERY: 7/1967
REMARKS:

WITHDRAWN: 8/1974
DISPOSAL: 6/1975

BUS NUMBER: 494-500 SERIAL NUMBER: C700-C706

MFR/MODEL: GMC TDH-5303

LENGTH: 40'4"(12 294 mm)
WIDTH: 9'5.75"(2 889 mm)
HEIGHT: 9'10"(2 947 mm)
WEIGHT: 21,500 lbs.(9 752 kg)

ENGINE: GM 6V-71
HORSEPOWER: 188(140 kW)
FUEL: DIESEL
SEATING: 52

ORDERED: 2/1965
DELIVERY: 6/1966
REMARKS:

WITHDRAWN:
DISPOSAL:

BUS NUMBER: 501/2nd-510/2nd
SERIAL NUMBER: C707-C716

MFR/MODEL: GMC TDH-5303

LENGTH: 40'4"(12 294 mm)
WIDTH: 9'5.75"(2 889 mm)
HEIGHT: 9'10"(2 947 mm)
WEIGHT: 21,500 lbs.(9 752 kg)

ENGINE: GM 6V-71
HORSEPOWER: 188(140 kW)
FUEL: DIESEL
SEATING: 52

ORDERED: 2/1965
DELIVERY: 6/1966
REMARKS:

WITHDRAWN:
DISPOSAL:

BUS NUMBER: 1-9/2nd
SERIAL NUMBER:

MFR/MODEL: TWIN COACH 41S

LENGTH: 32'10"(10 008 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 9'(2 743 mm)
WEIGHT: 24,000 lbs.(10 886 kg

ENGINE: FTC-180
HORSEPOWER: 180(134 kW)
FUEL: GASOLINE
SEATING: 41

BUILT: 1947
DELIVERY: 11/1962
REMARKS: FORMER 501-509, RENUMBERED 6/1966

WITHDRAWN: 1968
DISPOSAL: 1968-1969

BUS NUMBER: 511/2nd-520/2nd
SERIAL NUMBER: C783-C792

MFR/MODEL: GMC TDH-5303

LENGTH: 40'4"(12 294 mm)
WIDTH: 9'5.75"(2 889 mm)
HEIGHT: 9'10"(2 997 mm)
WEIGHT: 21,500 lbs.(9 752 kg)

ENGINE: GM 6V-71
HORSEPOWER: 188(140 kW)
FUEL: DIESEL
SEATING: 52

ORDERED: 12/1966
DELIVERY: 1967
REMARKS:

WITHDRAWN: N/A
DISPOSAL: N/A

BUS NUMBER: 521-535 SERIAL NUMBER: C793-C807

MFR/MODEL: GMC TDH-5303

LENGTH: 40'4"(12 294 mm) ENGINE: GM 6V-71
WIDTH: 9'5.75"(2 889 mm) HORSEPOWER: 188(140 kW)
HEIGHT: 9'10"(2 997 mm) FUEL: DIESEL
WEIGHT: 21,500 lbs.(9 752 kg) SEATING: 52

ORDERED: 12/1966 WITHDRAWN: N/A
DELIVERY: 1967 DISPOSAL: N/A
REMARKS:

BUS NUMBER: 11-12/2nd SERIAL NUMBER:

MFR/MODEL: TWIN COACH 38S

LENGTH: 31'(9 449 mm) ENGINE: FTC-180
WIDTH: 8'(2 438 mm) HORSEPOWER: 180(134 kW)
HEIGHT: 9'(2 743 mm) FUEL: GASOLINE
WEIGHT: 24,000 lbs.(10 886 kg SEATING: 38

BUILT: 1946 WITHDRAWN: 1968
DELIVERY: 11/1962 DISPOSAL: 1969-1970
REMARKS: FORMER 512-513, RENUMBERED 6/1966

BUS NUMBER: 13/2nd SERIAL NUMBER: 914C

MFR/MODEL: TWIN COACH 38S

LENGTH: 31'(9 449 mm) ENGINE: FTC-180
WIDTH: 8'(2 438 mm) HORSEPOWER: 180(134 kW)
HEIGHT: 9'(2 743 mm) FUEL: GASOLINE
WEIGHT: 24,000 lbs.(10 886 kg SEATING: 38

BUILT: 1948 WITHDRAWN: 1968
DELIVERY: 11/1962 DISPOSAL: 9/1969
REMARKS: FORMER 516, RENUMBERED 6/1966

BUS NUMBER: 14/2nd
SERIAL NUMBER: 917C

MFR/MODEL: TWIN COACH 38S

LENGTH: 31'(9 449 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 9'(2 743 mm)
WEIGHT: 24,000 lbs.(10 886 kg

ENGINE: FTC-180
HORSEPOWER: 180(134 kW)
FUEL: GASOLINE
SEATING: 38

BUILT: 1948
DELIVERY: 11/1962
WITHDRAWN: 1968
DISPOSAL:
REMARKS: FORMER 519, RENUMBERED 6/1966

BUS NUMBER: 1-10/3rd
SERIAL NUMBER: C004-C013

MFR/MODEL: GMC T6H-4521

LENGTH: 35'3"(10 744 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 10'0.25"(3 054 mm)
WEIGHT: 19,700 lbs.(8 936 kg)

ENGINE: GM 6V-71
HORSEPOWER: 188(140 kW)
FUEL: DIESEL
SEATING: 45

ORDERED: 2/1968
DELIVERY: 1968
WITHDRAWN: N/A
DISPOSAL: N/A
REMARKS:

BUS NUMBER: 600
SERIAL NUMBER: 00092

MFR/MODEL: MITSUBISHI-FUSO, MAR750L

LENGTH: 39'11.5"(12 179 mm)
WIDTH: 8'2"(2 490 mm)
HEIGHT: 10'2"(3 100 mm)
WEIGHT: 22,920 lbs.(10 420 kg

ENGINE: MITSUBISHI 8DB20A
HORSEPOWER: 233(174 kW)
FUEL: DIESEL
SEATING: 51

BUILT: 1963
DELIVERY: 3/1964
WITHDRAWN: 6/1971
DISPOSAL: 1971
REMARKS: FORMER 10, RENUMBERED IN 1968

BUS NUMBER: 11-14/3rd
SERIAL NUMBER: C115-C118

MFR/MODEL: GMC T6H-4521

LENGTH: 35'3"(10 744 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 10'0.25"(3 054 mm)
WEIGHT: 19,700 lbs.(8 936 kg)

ENGINE: GM 6V-71
HORSEPOWER: 188(140 kW)
FUEL: DIESEL
SEATING: 45

ORDERED: 6/1969
DELIVERY: 1969
REMARKS:

WITHDRAWN: N/A
DISPOSAL: N/A

BUS NUMBER: 15-25/2nd
SERIAL NUMBER: C119-C129

MFR/MODEL: GMC T6H-4521

LENGTH: 35'3"(10 744 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 10'0.25"(3 054 mm)
WEIGHT: 19,700 lbs.(8 936 kg)

ENGINE: GM 6V-71
HORSEPOWER: 188(140 kW)
FUEL: DIESEL
SEATING: 45

ORDERED: 6/1969
DELIVERY: 1969
REMARKS:

WITHDRAWN: N/A
DISPOSAL: N/A

BUS NUMBER: 99
SERIAL NUMBER: 48-2766

MFR/MODEL: CCF-BRILL, C-36

LENGTH: 30'9.5"(9 385 mm)
WIDTH: 7'11.75"(2 432 mm)
HEIGHT: 9'6"(2 896 mm)
WEIGHT: 15,085 lbs.(6 843 kg)

ENGINE: HALL-SCOTT 136, 6-CYL.
HORSEPOWER: 150(112 kW)
FUEL: GASOLINE
SEATING: 36

ORDERED: 1948
DELIVERY: 10/1948
REMARKS: NOT IN SERVICE, PRESERVED BY ETS

WITHDRAWN: 1969
DISPOSAL: 1969

BUS NUMBER: 700 SERIAL NUMBER: 7222

MFR/MODEL: WFC D700A

LENGTH: 40'6.25"(12 351 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'3"(3 124 mm)
WEIGHT: 22,900 lbs.(10 387 kg

ENGINE: DETROIT DIESEL 6V-71
HORSEPOWER: 188(140 kW)
FUEL: DIESEL
SEATING: 51

BUILT: 1970
DELIVERY: 4/1972

WITHDRAWN: 1978
DISPOSAL: 1978

REMARKS: LEASED 1971; RENUMBERED 800 IN 1977

BUS NUMBER: 536-569 SERIAL NUMBER: C067-C100

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'5.75"(2 585 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT:

ENGINE: GM 6V-71N
HORSEPOWER: 219(163 kW)
FUEL: DIESEL
SEATING: 49

ORDERED: 4/1972
DELIVERY: 10-11/1972

WITHDRAWN: N/A
DISPOSAL: N/A

REMARKS:

BUS NUMBER: 26-35/2nd SERIAL NUMBER: C087-C096

MFR/MODEL: GMC T6H-4523N

LENGTH: 35'3"(10 744 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 10'0.25"(3 054 mm)
WEIGHT: 19,700 lbs.(8 936 kg)

ENGINE: GM 6V-71N
HORSEPOWER: 219(163 kW)
FUEL: DIESEL
SEATING: 45

ORDERED: 6/1973
DELIVERY: 11-12/1973

WITHDRAWN: N/A
DISPOSAL: N/A

REMARKS:

BUS NUMBER: 570-590
SERIAL NUMBER: C595-C615

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'5.75"(2 585 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT:

ENGINE: GM 6V-71N
HORSEPOWER: 219(163 kW)
FUEL: DIESEL
SEATING: 49

ORDERED: 6/1973
DELIVERY: 11-12/1973
REMARKS:

WITHDRAWN: N/A
DISPOSAL: N/A

BUS NUMBER: 731-740
SERIAL NUMBER: 373-382

MFR/MODEL: FIL SERIES D800, MODEL D10240

LENGTH: 40'(12 192 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'4"(3 150 mm)
WEIGHT:

ENGINE: DETROIT DIESEL 6V-71
HORSEPOWER: 188(140 kW)
FUEL: DIESEL
SEATING: 49

ORDERED: 6/1973
DELIVERY: 7/1974
REMARKS: RENUMBERED 831-840, 1977

WITHDRAWN:
DISPOSAL:

BUS NUMBER: 591-599
SERIAL NUMBER: C993-C1001

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'5.75"(2 591 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT:

ENGINE: GM 6V-71N
HORSEPOWER: 219(163 kW)
FUEL: DIESEL
SEATING: 49

ORDERED: 1973
DELIVERY: 11-12/1974
REMARKS:

WITHDRAWN: N/A
DISPOSAL: N/A

BUS NUMBER: 600/2nd
SERIAL NUMBER: C1002

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'5.75"(2 591 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT:
ENGINE: GM 6V-71N
HORSEPOWER: 219(163 kW)
FUEL: DIESEL
SEATING: 49

ORDERED: 1973
DELIVERY: 11-12/1974
WITHDRAWN: N/A
DISPOSAL: N/A
REMARKS:

BUS NUMBER: 301-321
SERIAL NUMBER: C1003-C1023

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'5.75"(2 591 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT:
ENGINE: GM 6V-71N
HORSEPOWER: 219(163 kW)
FUEL: DIESEL
SEATING: 49

ORDERED: 1973
DELIVERY: 11-12/1974
WITHDRAWN: N/A
DISPOSAL: N/A
REMARKS: INCORRECTLY NUMBERED 601-621 BY GMC

BUS NUMBER: 322-371
SERIAL NUMBER: C1350-C1399

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'5.75"(2 591 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT:
ENGINE: GM 6V-71N
HORSEPOWER: 219(163 kW)
FUEL: DIESEL
SEATING: 49

ORDERED: 1974
DELIVERY: 7-8/1975
WITHDRAWN: N/A
DISPOSAL: N/A
REMARKS:

BUS NUMBER: 372-396　　SERIAL NUMBER: C1481-C1505

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'5.75"(2 591 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT:

ENGINE: GM 6V-71N
HORSEPOWER: 219(163 kW)
FUEL: DIESEL
SEATING: 47

ORDERED: 1974
DELIVERY: 12/1975
REMARKS:

WITHDRAWN: N/A
DISPOSAL: N/A

BUS NUMBER: 801/2nd-805/2nd　　SERIAL NUMBER:

MFR/MODEL: BLUEBIRD SCHOOL BUS, FC3400

LENGTH:
WIDTH:
HEIGHT:
WEIGHT:

ENGINE:
HORSEPOWER:
FUEL: GASOLINE
SEATING: 72

ORDERED: 1974
DELIVERY: 1975
REMARKS: SCHOOL SERVICE ONLY, SOLD

WITHDRAWN: 1981
DISPOSAL: 1981

BUS NUMBER: 806-810　　SERIAL NUMBER:

MFR/MODEL: BLUEBIRD SCHOOL BUS, FC3400

LENGTH:
WIDTH:
HEIGHT:
WEIGHT:

ENGINE:
HORSEPOWER:
FUEL: GASOLINE
SEATING: 72

ORDERED: 1974
DELIVERY: 1975
REMARKS: SCHOOL SERVICE ONLY, SOLD

WITHDRAWN: 1981
DISPOSAL: 1981

BUS NUMBER: 1-10(SPEC.) SERIAL NUMBER: C1596-C1605

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'5.75"(2 591 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT:

ENGINE: GM 6V-71N
HORSEPOWER: 219(163 kW)
FUEL: DIESEL
SEATING: 49

ORDERED: 1975
DELIVERY: 2/1976

WITHDRAWN: N/A
DISPOSAL: N/A

REMARKS: ST. ALBERT SERVICE, RENUMBERED 811-820 IN 1977

BUS NUMBER: 397-399 SERIAL NUMBER: C1626-C1628

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'5.75"(2 591 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT:

ENGINE: GM 6V-71N
HORSEPOWER: 219(163 kW)
FUEL: DIESEL
SEATING: 47

ORDERED: 1975
DELIVERY: 4-5/1976

WITHDRAWN: N/A
DISPOSAL: N/A

REMARKS:

BUS NUMBER: 601-613/2nd SERIAL NUMBER: C1629-C1641

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'5.75"(2 591 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT:

ENGINE: GM 6V-71N
HORSEPOWER: 219(163 kW)
FUEL: DIESEL
SEATING: 47

ORDERED: 1975
DELIVERY: 4-5/1976

WITHDRAWN: N/A
DISPOSAL: N/A

REMARKS:

BUS NUMBER: 614-657 SERIAL NUMBER: C1642-C1685

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'5.75"(2 591 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT:

ENGINE: GM 6V-71N
HORSEPOWER: 219(163 kW)
FUEL: DIESEL
SEATING: 47

ORDERED: 1975
DELIVERY: 4-5/1976
REMARKS:

WITHDRAWN: N/A
DISPOSAL: N/A

BUS NUMBER: 658-697 SERIAL NUMBER: C1733-C1772

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'5.75"(2 591 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT:

ENGINE: GM 6V-71N
HORSEPOWER: 219(163 kW)
FUEL: DIESEL
SEATING: 47

ORDERED:
DELIVERY: 1976
REMARKS:

WITHDRAWN: N/A
DISPOSAL: N/A

BUS NUMBER: 698-699 SERIAL NUMBER: C1868-C1869

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'5.75"(2 591 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT:

ENGINE: GM 6V-71N
HORSEPOWER: 219(163 kW)
FUEL: DIESEL
SEATING: 47

ORDERED:
DELIVERY: 1977
REMARKS:

WITHDRAWN: N/A
DISPOSAL: N/A

BUS NUMBER: 700/2nd
SERIAL NUMBER: C1870

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'5.75"(2 591 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT:

ENGINE: GM 6V-71N
HORSEPOWER: 219(163 kW)
FUEL: DIESEL
SEATING: 47

ORDERED:
DELIVERY: 1977
REMARKS:

WITHDRAWN: N/A
DISPOSAL: N/A

BUS NUMBER: 800
SERIAL NUMBER: 7222

MFR/MODEL: WFC D700A

LENGTH: 40'6.25"(12 351 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'3"(3 124 mm)
WEIGHT: 22,900 lbs.(10 387 kg

ENGINE: DETROIT DIESEL 6V-71
HORSEPOWER: 188(140 kW)
FUEL: DIESEL
SEATING: 51

BUILT: 1970
DELIVERY: 4/1972

WITHDRAWN: 1978
DISPOSAL: 1978

REMARKS: FORMER 700, RENUMBERED IN 1977

BUS NUMBER: 701/2nd-728/2nd
SERIAL NUMBER: C1871-C1898

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'5.75"(2 591 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT:

ENGINE: GM 6V-71N
HORSEPOWER: 219(163 kW)
FUEL: DIESEL
SEATING: 47

ORDERED:
DELIVERY: 1977
REMARKS:

WITHDRAWN: N/A
DISPOSAL: N/A

BUS NUMBER: 729-732 SERIAL NUMBER: C1899-C1902

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'5.75"(2 591 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT:

ENGINE: GM 6V-71N
HORSEPOWER: 219(163 kW)
FUEL: DIESEL
SEATING: 47

ORDERED:
DELIVERY: 1977
REMARKS:

WITHDRAWN: N/A
DISPOSAL: N/A

BUS NUMBER: 831/2nd-840/2nd SERIAL NUMBER: 0373-0382

MFR/MODEL: FIL, SERIES D800, MODEL D10240

LENGTH: 40'(12 192 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'4"(3 150 mm)
WEIGHT:

ENGINE: DETROIT DIESEL 6V-71
HORSEPOWER: 188(140 kW)
FUEL: DIESEL
SEATING: 49

ORDERED: 6/1973
DELIVERY: 7/1974
REMARKS: FORMER 731-740, RENUMBERED IN 1977

WITHDRAWN:
DISPOSAL:

BUS NUMBER: 811-820 SERIAL NUMBER: C1596-C1605

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'5.75"(2 591 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT:

ENGINE: GM 6V-71N
HORSEPOWER: 219(163 kW)
FUEL: DIESEL
SEATING: 49

ORDERED: 1975
DELIVERY: 2/1976
REMARKS: ST. ALBERT SERVICE ONLY, FORMER 1-10(SPEC.), REN. IN 1977

WITHDRAWN: N/A
DISPOSAL: N/A

BUS NUMBER: 821 SERIAL NUMBER: C1911

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm) ENGINE: GM 6V-71N
WIDTH: 8'5.75"(2 591 mm) HORSEPOWER: 219(163 kW)
HEIGHT: 10'(3 048 mm) FUEL: DIESEL
WEIGHT: SEATING: 49

ORDERED: WITHDRAWN: N/A
DELIVERY: 1977 DISPOSAL: N/A
REMARKS: ST. ALBERT SERVICE ONLY

BUS NUMBER: 841-858 SERIAL NUMBER: 1284-1301

MFR/MODEL: FIL, SERIES D800, MODEL D10240

LENGTH: 40'(12 192 mm) ENGINE: DETROIT DIESEL 6V-71N
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 219(163 kW)
HEIGHT: 10'4"(3 150 mm) FUEL: DIESEL
WEIGHT: SEATING: 49

ORDERED: WITHDRAWN: N/A
DELIVERY: 1977 DISPOSAL: N/A
REMARKS:

BUS NUMBER: 859/2nd-868/2nd SERIAL NUMBER: C1916-C1925

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm) ENGINE: GM 6V-71N
WIDTH: 8'5.75"(2 591 mm) HORSEPOWER: 219(163 kW)
HEIGHT: 10'(3 048 mm) FUEL: DIESEL
WEIGHT: SEATING: 49

ORDERED: WITHDRAWN: N/A
DELIVERY: 1977 DISPOSAL: N/A
REMARKS: COUNTY OF STRATHCONA SERVICE ONLY

BUS NUMBER: 733-767
SERIAL NUMBER: C2030-C2064

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'5.75"(2 591 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT:
ENGINE: GM 6V-71N
HORSEPOWER: 219(163 kW)
FUEL: DIESEL
SEATING: 47

ORDERED:
DELIVERY: 1977
REMARKS:
WITHDRAWN: N/A
DISPOSAL: N/A

BUS NUMBER: 768-799
SERIAL NUMBER: C2199-C2230

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'5.75"(2 591 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT:
ENGINE: GM 6V-71N
HORSEPOWER: 219(163 kW)
FUEL: DIESEL
SEATING: 47

ORDERED: 1977
DELIVERY: 1978
REMARKS:
WITHDRAWN: N/A
DISPOSAL: N/A

BUS NUMBER: 900-925
SERIAL NUMBER: C2231-C2256

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'5.75"(2 591 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT:
ENGINE: GM 6V-71N
HORSEPOWER: 219(163 kW)
FUEL: DIESEL
SEATING: 47

ORDERED: 1977
DELIVERY: 1978
REMARKS:
WITHDRAWN: N/A
DISPOSAL: N/A

BUS NUMBER: 822-824 SERIAL NUMBER: M1199-M1201

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm) ENGINE: GM 6V-71N
WIDTH: 8'5.75"(2 591 mm) HORSEPOWER: 219(163 kW)
HEIGHT: 10'(3 048 mm) FUEL: DIESEL
WEIGHT: SEATING:

ORDERED: WITHDRAWN: N/A
DELIVERY: 1979 DISPOSAL: N/A
REMARKS: ST. ALBERT SERVICE ONLY

BUS NUMBER: 926-955 SERIAL NUMBER: M1814-M1843

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm) ENGINE: GM 6V-71N
WIDTH: 8'5.75"(2 591 mm) HORSEPOWER: 219(163 kW)
HEIGHT: 10'(3 048 mm) FUEL: DIESEL
WEIGHT: SEATING: 49

ORDERED: 7/1979 WITHDRAWN: N/A
DELIVERY: 1980 DISPOSAL: N/A
REMARKS: HAVE ELECTRONIC SIGNS & CLOTH UPHOLSTERY

BUS NUMBER: 956-995 SERIAL NUMBER: M1844-M1883

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm) ENGINE: GM 6V-71N
WIDTH: 8'5.75"(2 591 mm) HORSEPOWER: 219(163 kW)
HEIGHT: 10'(3 048 mm) FUEL: DIESEL
WEIGHT: SEATING: 47

ORDERED: 7/1979 WITHDRAWN: N/A
DELIVERY: 1980 DISPOSAL: N/A
REMARKS: 956-970 HAVE ELECTRONIC SIGNS

BUS NUMBER: 825-827
SERIAL NUMBER: M1990-M1992

MFR/MODEL: GMC T6H-5307N

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'5.75"(2 591 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT:

ENGINE: GM 6V-71N
HORSEPOWER: 192(143 kW)
FUEL: DIESEL
SEATING:

ORDERED:
DELIVERY: 1980

WITHDRAWN: N/A
DISPOSAL: N/A

REMARKS: ST. ALBERT SERVICE ONLY

BUS NUMBER: N/A SERIAL NUMBER:

MFR/MODEL: GMC

LENGTH: ENGINE: GMC
WIDTH: HORSEPOWER:
HEIGHT: FUEL: GASOLINE
WEIGHT: SEATING: 21

ORDERED: N/A WITHDRAWN: 11/1941
DELIVERY: 11/1938 DISPOSAL: N/A
REMARKS: LEASED FROM BUS UNIVERSAL SUPPLY LTD.

BUS NUMBER: N/A SERIAL NUMBER:

MFR/MODEL: GMC

LENGTH: ENGINE: GMC
WIDTH: HORSEPOWER:
HEIGHT: FUEL: GASOLINE
WEIGHT: SEATING: 21

ORDERED: N/A WITHDRAWN: 11/1941
DELIVERY: 11/1938 DISPOSAL: N/A
REMARKS: LEASED FROM BUS UNIVERSAL SUPPLY LTD.

BUS NUMBER: N/A
SERIAL NUMBER: 6-G-3466

MFR/MODEL: FORD MOTOR CO.

LENGTH:
WIDTH:
HEIGHT:
WEIGHT:

ENGINE: FORD
HORSEPOWER:
FUEL: GASOLINE
SEATING:

ORDERED: N/A
DELIVERY: 1946
WITHDRAWN: 2/1947
DISPOSAL: N/A
REMARKS: LEASED FROM MCMULLEN & NOULLETT

BUS NUMBER: (M132)
SERIAL NUMBER: 218

MFR/MODEL: TWIN COACH, 41S

LENGTH: 32'10"(10 008 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 9'(2 743 mm)
WEIGHT: 24,000 lbs.(10 886 kg

ENGINE: FTC-180
HORSEPOWER: 180(134 kW)
FUEL: GASOLINE
SEATING: 41

ORDERED: N/A
DELIVERY: 12/1951
WITHDRAWN: 3/1952
DISPOSAL: N/A
REMARKS: LEASED FROM B.C. ELECTRIC, VANCOUVER

BUS NUMBER: (M133)
SERIAL NUMBER: 216

MFR/MODEL: TWIN COACH, 41S

LENGTH: 32'10"(10 008 mm)
WIDTH: 8'(2 438 mm)
HEIGHT: 9'(2 743 mm)
WEIGHT: 24,000 lbs.(10 886 kg

ENGINE: FTC-180
HORSEPOWER: 180(134 kW)
FUEL: GASOLINE
SEATING: 41

ORDERED: N/A
DELIVERY: 12/1951
WITHDRAWN: 3/1952
DISPOSAL: N/A
REMARKS: LEASED FROM B.C. ELECTRIC, VANCOUVER

BUS NUMBER: (M134) SERIAL NUMBER: 233

MFR/MODEL: TWIN COACH, 41S

LENGTH: 32'10"(10 008 mm) ENGINE: FTC-180
WIDTH: 8'(2 438 mm) HORSEPOWER: 180(134 kW)
HEIGHT: 9'(2 743 mm) FUEL: GASOLINE
WEIGHT: 24,000 lbs.(10 886 kg SEATING: 41

ORDERED: N/A WITHDRAWN: 3/1952
DELIVERY: 12/1951 DISPOSAL: N/A
REMARKS: LEASED FROM B.C. ELECTRIC, VANCOUVER

BUS NUMBER: (M135) SERIAL NUMBER: 141

MFR/MODEL: TWIN COACH, 41S

LENGTH: 32'10"(10 008 mm) ENGINE: FTC-180
WIDTH: 8'(2 438 mm) HORSEPOWER: 180(134 kW)
HEIGHT: 9'(2 743 mm) FUEL: GASOLINE
WEIGHT: 24,000 lbs.(10 886 kg SEATING: 41

ORDERED: N/A WITHDRAWN: 3/1952
DELIVERY: 12/1951 DISPOSAL: N/A
REMARKS:

BUS NUMBER: (M136) SERIAL NUMBER: 213

MFR/MODEL: TWIN COACH, 41S

LENGTH: 32'10"(10 008 mm) ENGINE: FTC-180
WIDTH: 8'(2 438 mm) HORSEPOWER: 180(134 kW)
HEIGHT: 9'(2 743 mm) FUEL: GASOLINE
WEIGHT: 24,000 lbs.(10 886 kg SEATING: 41

ORDERED: N/A WITHDRAWN: 3/1952
DELIVERY: 12/1951 DISPOSAL: N/A
REMARKS: LEASED FROM B.C. ELECTRIC, VANCOUVER

BUS NUMBER: (M137) SERIAL NUMBER: 207

MFR/MODEL: TWIN COACH, 41S

LENGTH: 32'10"(10 008 mm) ENGINE: FTC-180
WIDTH: 8'(2 438 mm) HORSEPOWER: 180(134 kW)
HEIGHT: 9'(2 743 mm) FUEL: GASOLINE
WEIGHT: 24,000 lbs.(10 886 kg SEATING: 41

ORDERED: N/A WITHDRAWN: 3/1952
DELIVERY: 12/1951 DISPOSAL: N/A
REMARKS: LEASED FROM B.C. ELECTRIC, VANCOUVER

BUS NUMBER: (M138) SERIAL NUMBER: 219

MFR/MODEL: TWIN COACH, 41S

LENGTH: 32'10"(10 008 mm) ENGINE: FTC-180
WIDTH: 8'(2 438 mm) HORSEPOWER: 180(134 kW)
HEIGHT: 9'(2 743 mm) FUEL: GASOLINE
WEIGHT: 24,000 lbs.(10 886 kg SEATING: 41

ORDERED: N/A WITHDRAWN: 3/1952
DELIVERY: 12/1951 DISPOSAL: N/A
REMARKS: LEASED FROM B.C. ELECTRIC, VANCOUVER

BUS NUMBER: (M139) SERIAL NUMBER: 256

MFR/MODEL: TWIN COACH, 41S

LENGTH: 32'10"(10 008 mm) ENGINE: FTC-180
WIDTH: 8'(2 438 mm) HORSEPOWER: 180(134 kW)
HEIGHT: 9'(2 743 mm) FUEL: GASOLINE
WEIGHT: 24,000 lbs.(10 886 kg SEATING: 41

ORDERED: N/A WITHDRAWN: 3/1952
DELIVERY: 12/1951 DISPOSAL: N/A
REMARKS: LEASED FROM B.C. ELECTRIC, VANCOUVER

This section of the Appendix contains a chronological listing of all new and used trolley buses obtained and operated between 1939 and 1982. This section also includes a listing of used trolley buses that were purchased for parts only, but which were never put into service in Edmonton.

The information includes: the bus number, the serial number (if available), the manufacturers and the model designation, major dimensions, vehicle weight, motor designation and rating, number of axles, seating capacity, order and delivery dates, disposal date, and any cogent remarks.

BUS NUMBER: 101

SERIAL NUMBER: 087

MFR/MODEL: CHASSIS - AEC, BODY - EE, 663T

LENGTH: 32'(9 754 mm)
WIDTH: 8'3"(2 515 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT: 18,620 lbs.(8 446 kg)

MOTOR: EE 408
HORSEPOWER: 115(85.8 kW)
AXLES: 3
SEATING: 38

ORDERED: 9/1938
DELIVERY: 9/1939
REMARKS: MODIFIED 1947-1948

WITHDRAWN: 1951
DISPOSAL: 1954

BUS NUMBER: 102

SERIAL NUMBER: 089

MFR/MODEL: CHASSIS - AEC, BODY - EE, 663T

LENGTH: 32'(9 754 mm)
WIDTH: 8'3"(2 515 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT: 18,620 lbs.(8 446 kg)

MOTOR: EE 408
HORSEPOWER: 115(85.8 kW)
AXLES: 3
SEATING: 38

ORDERED: 9/1938
DELIVERY: 9/1939
REMARKS: MODIFIED 1947 - 1948

WITHDRAWN: 11/1950
DISPOSAL: 1954

BUS NUMBER: 103 SERIAL NUMBER: 088

MFR/MODEL: CHASSIS - AEC, BODY - EE, 663T

LENGTH: 32'(9 754 mm)
WIDTH: 8'3"(2 515 mm)
HEIGHT: 10'(3 048 mm)
WEIGHT: 18,620 lbs.(8 446 kg)

MOTOR: EE 408
HORSEPOWER: 115(85.8 kW)
AXLES: 3
SEATING: 38

ORDERED: 9/1938
DELIVERY: 9/1939
REMARKS: MODIFIED 1947 - 1948

WITHDRAWN: 11/1950
DISPOSAL: 1954

BUS NUMBER: 104-106 SERIAL NUMBER: 302343 to 302345

MFR/MODEL: CHASSIS - LEYLAND, BODY - PARK ROYAL COACH, TTB

LENGTH: 32'6"(9 906 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'3"(3 124 mm)
WEIGHT:

MOTOR: GEC WT 265
HORSEPOWER: 135(100.7 kW)
AXLES: 3
SEATING: 38

ORDERED: 9/1938
DELIVERY: 9/1939
REMARKS: MODIFIED 1947 - 1948

WITHDRAWN: 1950-1951
DISPOSAL: 1954

BUS NUMBER: 107 SERIAL NUMBER: 305790

MFR/MODEL: CHASSIS - LEYLAND, BODY - PARK ROYAL COACH, TTB

LENGTH: 32'6"(9 906 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'3"(3 124 mm)
WEIGHT:

MOTOR: GEC WT 265
HORSEPOWER: 135(100.7 kW)
AXLES: 3
SEATING: 38

ORDERED: 11/1939
DELIVERY: 7/1942
REMARKS: MODIFIED 1947 - 1948

WITHDRAWN: 1951
DISPOSAL: 1954

BUS NUMBER: 108
SERIAL NUMBER: 305792

MFR/MODEL: CHASSIS - LEYLAND, BODY - PARK ROYAL COACH, TTB

LENGTH: 32'6"(9 906 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'3"(3 124 mm)
WEIGHT:

MOTOR: GEC WT 265
HORSEPOWER: 135(100.7 kW)
AXLES: 3
SEATING: 38

ORDERED: 11/1939
DELIVERY: 7/1942
REMARKS: MODIFIED 1947 - 1948

WITHDRAWN: 1951
DISPOSAL: 1954

BUS NUMBER: 109
SERIAL NUMBER: 305791

MFR/MODEL: CHASSIS - LEYLAND, BODY - PARK ROYAL COACH, TTB

LENGTH: 32'6"(9 906 mm)
WIDTH: 8'2"(2 489 mm)
HEIGHT: 10'3"(3 124 mm)
WEIGHT:

MOTOR: GEC WT 265
HORSEPOWER: 135(100.7 kW)
AXLES: 3
SEATING: 38

ORDERED: 11/1939
DELIVERY: 7/1942
REMARKS: MODIFIED 1947 - 1948

WITHDRAWN: 1951
DISPOSAL: 1954

BUS NUMBER: 110-112
SERIAL NUMBER: 1276-1278

MFR/MODEL: MACK MANUFACTURING, CR

LENGTH: 34'11.5"(10 655 mm)
WIDTH: 8'3"(2 515 mm)
HEIGHT: 9'8"(2 946 mm)
WEIGHT: 21,440 lbs.(9 707 kg)

MOTOR: GE 1213D7
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 40

ORDERED: 5/1942
DELIVERY: 2/1943
REMARKS:

WITHDRAWN: 10/1962
DISPOSAL: 1964

BUS NUMBER: 113-115 SERIAL NUMBER: 5497-5499

MFR/MODEL: PULLMAN-STANDARD, 41CS-100-44CX

LENGTH: 37'9"(11 506 mm) MOTOR: GE 1213D7
WIDTH: 8'4.15"(2 544 mm) HORSEPOWER: 140(104.4 kW)
HEIGHT: 10'9.5"(3 289 mm) AXLES: 2
WEIGHT: 21,100 lbs.(9 571 kg) SEATING: 44

ORDERED: 8/1943 WITHDRAWN: 1964-1966
DELIVERY: 7/1944 DISPOSAL: 1964-1966
REMARKS:

BUS NUMBER: 116 SERIAL NUMBER: 5500

MFR/MODEL: PULLMAN-STANDARD, 41CS-100-44CX

LENGTH: 37'9"(11 506 mm) MOTOR: GE 1213D7
WIDTH: 8'4.15"(2 544 mm) HORSEPOWER: 140(104.4 kW)
HEIGHT: 10'9.5"(3 289 mm) AXLES: 2
WEIGHT: 21,100 lbs.(9 571 kg) SEATING: 44

ORDERED: 8/1943 WITHDRAWN: 3/1966
DELIVERY: 7/1944 DISPOSAL: N/A
REMARKS: PRESERVED BY ETS, RENUMBERED 113

BUS NUMBER: 117-120 SERIAL NUMBER: 5501-5504

MFR/MODEL: PULLMAN-STANDARD, 41CS-100-44CX

LENGTH: 37'9"(11 506 mm) MOTOR: GE 1213D7
WIDTH: 8'4.15"(2 544 mm) HORSEPOWER: 140(104.4 kW)
HEIGHT: 10'9.5"(3 289 mm) AXLES: 2
WEIGHT: 21,100 lbs.(9 571 kg) SEATING: 44

ORDERED: 8/1943 WITHDRAWN: 1966
DELIVERY: 7/1944 DISPOSAL: 1966
REMARKS:

BUS NUMBER: 121-128
SERIAL NUMBER: 5679-5686

MFR/MODEL: PULLMAN-STANDARD, 44AS-100-44CX

LENGTH: 37'9"(11 506 mm)
WIDTH: 8'4.15"(2 544 mm)
HEIGHT: 10'9.5"(3 289 mm)
WEIGHT: 21,100 lbs.(9 571 kg)

MOTOR: GE 1213D7
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

ORDERED: 6/1944
DELIVERY: 8-9/1945
REMARKS:

WITHDRAWN: 1964-1966
DISPOSAL: 1964-1966

BUS NUMBER: 129
SERIAL NUMBER: 164 (U.L. 5071)

MFR/MODEL: ACF-BRILL, TC-44

LENGTH: 37'11.5"(11 570 mm)
WIDTH: 8'4.5"(2 553 mm)
HEIGHT: 9'6"(2 896 mm)
WEIGHT: 20,600 lbs.(9 344 kg)

MOTOR: GE 1213D7
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

ORDERED: 4/1945
DELIVERY: 11/1945
REMARKS:

WITHDRAWN: 4/1966
DISPOSAL: 1966

BUS NUMBER: 130
SERIAL NUMBER: 165 (U.L. 5872)

MFR/MODEL: ACF-BRILL, TC-44

LENGTH: 37'11.5"(11 570 mm)
WIDTH: 8'4.5"(2 553 mm)
HEIGHT: 9'6"(2 896 mm)
WEIGHT: 20,600 lbs.(9 344 kg)

MOTOR: GE 1213D7
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

ORDERED: 4/1945
DELIVERY: 11/1945
REMARKS:

WITHDRAWN: 4/1966
DISPOSAL: 1966

BUS NUMBER: 131-147
SERIAL NUMBER: 46-5023 - 46-5039

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA1
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

ORDERED: 10/1945
DELIVERY: 1-2/1947
REMARKS:

WITHDRAWN: 1973-1978
DISPOSAL: 1973-1979

BUS NUMBER: 148
SERIAL NUMBER: 47-5040

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA1
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

ORDERED: 10/1945
DELIVERY: 2/1947
REMARKS: PRESERVED BY E.T.

WITHDRAWN: 1978
DISPOSAL: N/A

BUS NUMBER: 149-152
SERIAL NUMBER: 47-5041 - 47-5044

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA1
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

ORDERED: 10/1945
DELIVERY: 2/1947
REMARKS:

WITHDRAWN: 1974-1978
DISPOSAL: 1974-1980

BUS NUMBER: 153-177
SERIAL NUMBER: 47-5176 - 47-5200

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA1
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

ORDERED: 3/1946
DELIVERY: 9/1947
REMARKS:

WITHDRAWN: 1973-1978
DISPOSAL: 1973-1980

BUS NUMBER: 178-179
SERIAL NUMBER: 48-5503, 48-5504

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

ORDERED: 3/1948
DELIVERY:
REMARKS:

WITHDRAWN: 1974-1975
DISPOSAL: 1974-1975

BUS NUMBER: 180-187
SERIAL NUMBER: 48-5542 - 48-5549

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

ORDERED: 3/1948
DELIVERY: 12/1948
REMARKS:

WITHDRAWN: 1974-1978
DISPOSAL: 1974-1979

BUS NUMBER: 188-190
SERIAL NUMBER: 49-5675 - 49-5677

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

ORDERED: 5/1949
DELIVERY: 11-12/1949
REMARKS:

WITHDRAWN: 1973-1978
DISPOSAL: 1973-1979

BUS NUMBER: 191
SERIAL NUMBER: 49-5678

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

ORDERED: 5/1949
DELIVERY: 12/1949
REMARKS: PRESERVED BY E.T.

WITHDRAWN: 1978
DISPOSAL: N/A

BUS NUMBER: 192
SERIAL NUMBER: 49-5679

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

ORDERED: 5/1949
DELIVERY: 12/1949
REMARKS:

WITHDRAWN: 1978
DISPOSAL: 1979

BUS NUMBER: 193-196
SERIAL NUMBER: 52-8276 - 52-8279

MFR/MODEL: CCF-BRILL, T-48A

LENGTH: 38'9.5"(11 824 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'6.25"(1 263 mm)
WEIGHT: 19,170 lbs.(8 696 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 48

ORDERED: 12/1951
DELIVERY: 3/1952
REMARKS:

WITHDRAWN: 1975-1978
DISPOSAL: 1975-1979

BUS NUMBER: 197-201
SERIAL NUMBER: 54-8340 - 54-8344

MFR/MODEL: CCF-BRILL, T-48A

LENGTH: 38'9.5"(11 824 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'6.25"(.1 263 mm)
WEIGHT: 19,170 lbs.(8 696 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 42

ORDERED: 8/1954
DELIVERY:
REMARKS:

WITHDRAWN: 1978
DISPOSAL: 1979

BUS NUMBER: 202
SERIAL NUMBER: 54-8345

MFR/MODEL: CCF-BRILL, T-48A

LENGTH: 38'9.5"(11 824 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'6.25"(1 263 mm)
WEIGHT: 19,170 lbs.(8 696 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 42

ORDERED: 8/1954
DELIVERY:
REMARKS: PRESERVED BY E.T.

WITHDRAWN: 1978
DISPOSAL: N/A

BUS NUMBER: 203-212 SERIAL NUMBER: 47-5241 - 47-5250

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm) MOTOR: CGE 1213PA
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 140(104.4 kW)
HEIGHT: 10'5"(3 175 mm) AXLES: 2
WEIGHT: 18,510 lbs.(8 396 kg) SEATING: 44

BUILT: 1947 WITHDRAWN: 1974-1978
DELIVERY: 1962 DISPOSAL: 1974-1979
REMARKS: FROM VANCOUVER, EX 2001-2010

BUS NUMBER: 113/2nd SERIAL NUMBER: 5500

MFR/MODEL: PULLMAN-STANDARD, 41CS-100-44CX

LENGTH: 37'9"(11 506 mm) MOTOR: GE 1213D7
WIDTH: 8'4.15"(2 544 mm) HORSEPOWER: 140(104.4 kW)
HEIGHT: 10'9.5"(3 289 mm) AXLES: 2
WEIGHT: 21,100 lbs.(9 571 kg) SEATING: 44

BUILT: 8/1943 WITHDRAWN: 3/1966
DELIVERY: 7/1944 DISPOSAL: N/A
REMARKS: ex 116, RENUMBERED IN 1966

BUS NUMBER: 121/2nd SERIAL NUMBER: 49-5662

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm) MOTOR: CGE 1213PA
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 140(104.4 kW)
HEIGHT: 10'5"(3 175 mm) AXLES: 2
WEIGHT: 18,510 lbs.(8 396 kg) SEATING: 44

BUILT: 1949 WITHDRAWN: 1978
DELIVERY: 1966 DISPOSAL: 1979
REMARKS: FROM REGINA, ex 134

BUS NUMBER: 122/2nd

SERIAL NUMBER: 49-5655

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

BUILT: 1949
DELIVERY: 1966
REMARKS: FROM REGINA, ex 127

WITHDRAWN: 1975
DISPOSAL: 1975

BUS NUMBER: 123/2nd

SERIAL NUMBER: 49-5661

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

BUILT: 1949
DELIVERY: 1966
REMARKS: FROM REGINA, ex 133

WITHDRAWN: BEFORE 1978
DISPOSAL:

BUS NUMBER: 124/2nd

SERIAL NUMBER: 49-5656

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

BUILT: 1949
DELIVERY: 1966
REMARKS: FROM REGINA, ex 128

WITHDRAWN: 1977
DISPOSAL: 1978

BUS NUMBER: 125/2nd
SERIAL NUMBER: 49-5653

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

BUILT: 1949
DELIVERY: 1966
REMARKS: FROM REGINA, ex 125

WITHDRAWN: 1978
DISPOSAL: 1979

BUS NUMBER: 126/2nd
SERIAL NUMBER: 49-5663

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

BUILT: 1949
DELIVERY: 1966
REMARKS: FROM REGINA, ex 135

WITHDRAWN: 1974
DISPOSAL: 1974

BUS NUMBER: 127/2nd
SERIAL NUMBER: 49-5664

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

BUILT: 1949
DELIVERY: 1966
REMARKS: FROM REGINA, ex 136

WITHDRAWN: 1978
DISPOSAL:

BUS NUMBER: 128/2nd
SERIAL NUMBER: 49-5668

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

BUILT: 1949
DELIVERY: 1966
REMARKS: FROM REGINA, ex 141

WITHDRAWN: 1978
DISPOSAL: 1979

BUS NUMBER: 129/2nd
SERIAL NUMBER: 49-5665

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

BUILT: 1949
DELIVERY: 1966
REMARKS: FROM REGINA, ex 137

WITHDRAWN: 1978
DISPOSAL: 1979

BUS NUMBER: 130/2nd
SERIAL NUMBER: 49-5674

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

BUILT: 1949
DELIVERY: 1966
REMARKS: FROM REGINA, ex 146

WITHDRAWN: 1978
DISPOSAL: 1979

BUS NUMBER: 213 SERIAL NUMBER: 395

MFR/MODEL: FIL, SERIES-E800, MODEL-E10240

LENGTH: 40'(12 192 mm) MOTOR: CGE 1213PA, RMFD.
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 140(104.4 kW)
HEIGHT: 10'6"(3 200 mm) AXLES: 2
WEIGHT: SEATING: 49

ORDERED: 1973 WITHDRAWN: N/A
DELIVERY: 10/1974 DISPOSAL: N/A
REMARKS: BODY MODIFIED AND REPAINTED, 1979

BUS NUMBER: 214-237 SERIAL NUMBER: 396-419

MFR/MODEL: FIL, SERIES-E800, MODEL-E10240

LENGTH: 40'(12 192 mm) MOTOR: CGE 1213PA, RMFD.
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 140(104.4 kW)
HEIGHT: 10'6"(3 200 mm) AXLES: 2
WEIGHT: SEATING: 49

ORDERED: 1973 WITHDRAWN: N/A
DELIVERY: 1975 DISPOSAL: N/A
REMARKS: BODIES MODIFIED AND REPAINTED, 1977-1981

BUS NUMBER: 238-249 SERIAL NUMBER: 420-431

MFR/MODEL: FIL, SERIES-E800, MODEL-E10240

LENGTH: 40'(12 192 mm) MOTOR: CGE 1213PA, RMFD.
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 140(104.4 kW)
HEIGHT: 10'6"(3 200 mm) AXLES: 2
WEIGHT: SEATING: 49

ORDERED: 1973 WITHDRAWN: N/A
DELIVERY: 1976 DISPOSAL: N/A
REMARKS: BODIES MODIFIED AND REPAINTED, 1977-1981

BUS NUMBER: 100 SERIAL NUMBER: SEE LIST BELOW

MFR/MODEL: BBC/GMC, 5307N

LENGTH: 39'11"(12 167 mm) MOTOR: BBC
WIDTH: 8'5.75"(2 585 mm) HORSEPOWER: 184(137.3 kW)
HEIGHT: AXLES: 2
WEIGHT: 21,385 lbs.(9 700 kg) SEATING: 42

ORDERED: 1980 WITHDRAWN: N/A
DELIVERY: 1981 DISPOSAL: N/A
REMARKS: FINAL ASSEMBLY IN EDMONTON BY CONTRACTOR

BUS NUMBER: 101/2nd-112/2nd SERIAL NUMBER: SEE LIST BELOW

MFR/MODEL: BBC/GMC, 5307N

LENGTH: 39'11"(12 167 mm) MOTOR: BBC
WIDTH: 8'5.75"(2 585 mm) HORSEPOWER: 184(137.3 kW)
HEIGHT: AXLES: 2
WEIGHT: 21,385 lbs.(9 700 kg) SEATING: 42

ORDERED: 1980 WITHDRAWN: N/A
DELIVERY: 1982 DISPOSAL: N/A
REMARKS: FINAL ASSEMBLY IN EDMONTON BY CONTRACTOR

BUS NUMBER: 113/3rd SERIAL NUMBER: SEE LIST BELOW

MFR/MODEL: BBC/GMC, 5307N

LENGTH: 39'11"(12 167 mm) MOTOR: BBC
WIDTH: 8'5.75"(2 585 mm) HORSEPOWER: 184(137.3 kW)
HEIGHT: AXLES: 2
WEIGHT: 21,385 lbs.(9 700 kg) SEATING: 42

ORDERED: 1980 WITHDRAWN: N/A
DELIVERY: 1982 DISPOSAL: N/A
REMARKS: FINAL ASSEMBLY IN EDMONTON BY CONTRACTOR

BUS NUMBER: 114/2nd-199/2nd
SERIAL NUMBER: SEE LIST BELOW

MFR/MODEL: BBC/GMC, 5307N

LENGTH: 39'11"(12 167 mm)
WIDTH: 8'5.75"(2 585 mm)
HEIGHT:
WEIGHT: 21,385 lbs.(9 700 kg)

MOTOR: BBC
HORSEPOWER: 184(137.3 kW)
AXLES: 2
SEATING: 42

ORDERED: 1980
DELIVERY: 1982

WITHDRAWN: N/A
DISPOSAL: N/A

REMARKS: FINAL ASSEMBLY IN EDMONTON BY CONTRACTOR

BUS	- MFR -		SERIAL NUMBER
100	B	BOVERI	2B9546PD3BE001
101	B	BOVERI	2B9546PD5BE002
102	B	BOVERI	2B9546PD7BE003
103	B	BOVERI	2B9546PD9BE004
104	B	BOVERI	2B9546PD0BE005
105	B	BOVERI	2B9546PD2BE006
106	B	BOVERI	2B9546PD4BE007
107	B	BOVERI	2B9546PD6BE008
108	B	BOVERI	2B9546PD8BE009
109	B	BOVERI	2B9546PD4BE010
110	B	BOVERI	2B9546PD6BE011
111	B	BOVERI	2B9546PD8BE012
112	B	BOVERI	2B9546PDXBE013
113	B	BOVERI	2B9546PD1BE014
114	B	BOVERI	2B9546PD3BE015
115	B	BOVERI	2B9546PD5BE016
116	B	BOVERI	2B9546PD7BE017
117	B	BOVERI	2B9546PD9BE018
118	B	BOVERI	2B9546PD0BE019
119	B	BOVERI	2B9546PD7BE020
120	B	BOVERI	2B9546PD9BE021
121	B	BOVERI	2B9546PD0BE022
122	B	BOVERI	2B9546PD2BE023
123	B	BOVERI	2B9546PD4BE024
124	B	BOVERI	2B9546PD6BE025
125	B	BOVERI	2B9546PD8BE026
126	B	BOVERI	2B9546PDXBE027
127	B	BOVERI	2B9546PD1BE028
128	B	BOVERI	2B9546PD3BE029
129	B	BOVERI	2B9546PDXBE030
130	B	BOVERI	2B9546PD1BE031
131	B	BOVERI	2B9546PD3BE032
132	B	BOVERI	2B9546PD5BE033
133	B	BOVERI	2B9546PD7BE034
134	B	BOVERI	2B9546PD9BE035
135	B	BOVERI	2B9546PD0BE036
136	B	BOVERI	2B9546PD2BE037
137	B	BOVERI	2B9546PD4BE038
138	B	BOVERI	2B9546PD6BE039
139	B	BOVERI	2B9546PD2BE040
140	B	BOVERI	2B9546PD4BE041
141	B	BOVERI	2B9546PD6BE042
142	B	BOVERI	2B9546PD8BE043
143	B	BOVERI	2B9546PDXBE044
144	B	BOVERI	2B9546PD1BE045
145	B	BOVERI	2B9546PD3BE046
146	B	BOVERI	2B9546PD5BE047
147	B	BOVERI	2B9546PD7BE048
148	B	BOVERI	2B9546PD9BE049
149	B	BOVERI	2B9546PD5BE050

BUS	- MFR -		SERIAL NUMBER
150	B	BOVERI	2B9546PD7BE051
151	B	BOVERI	2B9546PD9BE052
152	B	BOVERI	2B9546PD0BE053
153	B	BOVERI	2B9546PD2BE054
154	B	BOVERI	2B9546PD4BE055
155	B	BOVERI	2B9546PD6BE056
156	B	BOVERI	2B9546PD8BE057
157	B	BOVERI	2B9546PDXBE058
158	B	BOVERI	2B9546PD1BE059
159	B	BOVERI	2B9546PD8BE060
160	B	BOVERI	2B9546PDXBE061
161	B	BOVERI	2B9546PD1BE062
162	B	BOVERI	2B9546PD3BE063
163	B	BOVERI	2B9546PD5BE064
164	B	BOVERI	2B9546PD7BE065
165	B	BOVERI	2B9546PD9BE066
166	B	BOVERI	2B9546PD0BE067
167	B	BOVERI	2B9546PD2BE068
168	B	BOVERI	2B9546PD4BE069
169	B	BOVERI	2B9546PD0BE070
170	B	BOVERI	2B9546PD2BE071
171	B	BOVERI	2B9546PD4BE072
172	B	BOVERI	2B9546PD6BE073
173	B	BOVERI	2B9546PD8BE074
174	B	BOVERI	2B9546PDXBE075
175	B	BOVERI	2B9546PD1BE076
176	B	BOVERI	2B9546PD3BE077
177	B	BOVERI	2B9546PD5BE078
178	B	BOVERI	2B9546PD7BE079
179	B	BOVERI	2B9546PD3BE080
180	B	BOVERI	2B9546PD5BE081
181	B	BOVERI	2B9546PD7BE082
182	B	BOVERI	2B9546PD9BE083
183	B	BOVERI	2B9546PD0BE084
184	B	BOVERI	2B9546PD2BE085
185	B	BOVERI	2B9546PD4BE086
186	B	BOVERI	2B9546PD6BE087
187	B	BOVERI	2B9546PD8BE088
188	B	BOVERI	2B9546PDXBE089
189	B	BOVERI	2B9546PD6BE090
190	B	BOVERI	2B9546PD8BE091
191	B	BOVERI	2B9546PDXBE092
192	B	BOVERI	2B9546PD1BE093
193	B	BOVERI	2B9546PD3BE094
194	B	BOVERI	2B9546PD5BE095
195	B	BOVERI	2B9546PD7BE096
196	B	BOVERI	2B9546PD9BE097
197	B	BOVERI	2B9546PD0BE098
198	B	BOVERI	2B9546PD2BE099
199	B	BOVERI	2B9546PD5BE100

Units Obtained for Parts Only

BUS NUMBER: N/A | SERIAL NUMBER: 47-5075

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)	MOTOR: CGE 1213PA
WIDTH: 8'6"(2 591 mm)	HORSEPOWER: 140(104.4 kW)
HEIGHT: 10'5"(3 175 mm)	AXLES: 2
WEIGHT: 18,510 lbs.(8 396 kg)	SEATING: 44
BUILT: 1947	WITHDRAWN: N/A
DELIVERY: 1969	DISPOSAL: 1972

REMARKS: FROM WINNIPEG, ex 1610

BUS NUMBER: N/A | SERIAL NUMBER: 47-5077-47-5079

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)	MOTOR: CGE 1213PA
WIDTH: 8'6"(2 591 mm)	HORSEPOWER: 140(104.4 kW)
HEIGHT: 10'5"(3 175 mm)	AXLES: 2
WEIGHT: 18,510 lbs.(8 396 kg)	SEATING: 44
BUILT: 1947	WITHDRAWN: N/A
DELIVERY: 1969	DISPOSAL: 1972

REMARKS: FROM WINNIPEG, ex 1614, 1616, 1618

BUS NUMBER: N/A
SERIAL NUMBER: 47-5082

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

BUILT: 1947
DELIVERY: 1969
WITHDRAWN: N/A
DISPOSAL: 1972
REMARKS: FROM WINNIPEG, ex 1624

BUS NUMBER: N/A
SERIAL NUMBER: 47-5084

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

BUILT: 1947
DELIVERY: 1969
WITHDRAWN: N/A
DISPOSAL: 1972
REMARKS: FROM WINNIPEG, ex 1628

BUS NUMBER: N/A
SERIAL NUMBER: 47-5086 & 47-5087

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

BUILT: 1947
DELIVERY: 1969
WITHDRAWN: N/A
DISPOSAL: 1972
REMARKS: FROM WINNIPEG, ex 1632, 1634

BUS NUMBER: N/A
SERIAL NUMBER: 47-5090 & 47-5091

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

BUILT: 1947
DELIVERY: 1969
WITHDRAWN: N/A
DISPOSAL: 1972
REMARKS: FROM WINNIPEG, ex 1640, 1642

BUS NUMBER: N/A
SERIAL NUMBER: 47-5505 to 47-550

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

BUILT: 1947
DELIVERY: 1969
WITHDRAWN: N/A
DISPOSAL: 1972
REMARKS: FROM WINNIPEG, ex 1650 to 1658, EVEN NUMBERS

BUS NUMBER: N/A
SERIAL NUMBER: 47-5139

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

BUILT: 1947
DELIVERY: 1974
WITHDRAWN: N/A
DISPOSAL: 1974
REMARKS: FROM CALGARY, ex 401

Units Obtained for Parts Only

BUS NUMBER: N/A SERIAL NUMBER: 47-5141-47-5143

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm) MOTOR: CGE 1213PA
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 140(104.4 kW)
HEIGHT: 10'5"(3 175 mm) AXLES: 2
WEIGHT: 18,510 lbs.(8 396 kg) SEATING: 44

BUILT: 1947 WITHDRAWN: N/A
DELIVERY: 1974 DISPOSAL: 1974
REMARKS: FROM CALGARY, ex 403-405

BUS NUMBER: N/A SERIAL NUMBER: 47-5150 & 47-5151

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm) MOTOR: CGE 1213PA
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 140(104.4 kW)
HEIGHT: 10'5"(3 175 mm) AXLES: 2
WEIGHT: 18,510 lbs.(8 396 kg) SEATING: 44

BUILT: 1947 WITHDRAWN: N/A
DELIVERY: 1974 DISPOSAL: 1974
REMARKS: FROM CALGARY, ex 412, 413

BUS NUMBER: N/A SERIAL NUMBER: 47-5153 & 47-5154

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm) MOTOR: CGE 1213PA
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 140(104.4 kW)
HEIGHT: 10'5"(3 175 mm) AXLES: 2
WEIGHT: 18,510 lbs.(8 396 kg) SEATING: 44

BUILT: 1947 WITHDRAWN: N/A
DELIVERY: 1974 DISPOSAL: 1974
REMARKS: FROM CALGARY, ex 415, 416

Units Obtained for Parts Only

BUS NUMBER: N/A
SERIAL NUMBER: 47-5166 & 47-5167

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

BUILT: 1947
DELIVERY: 1974
WITHDRAWN: N/A
DISPOSAL: 1974
REMARKS: FROM CALGARY, ex 428, 429

BUS NUMBER: N/A
SERIAL NUMBER: 48-5216

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

BUILT: 1948
DELIVERY: 1974
WITHDRAWN: N/A
DISPOSAL: 1974
REMARKS: FROM CALGARY, ex 435

BUS NUMBER: N/A
SERIAL NUMBER: 48-5234 & 48-5235

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm)
WIDTH: 8'6"(2 591 mm)
HEIGHT: 10'5"(3 175 mm)
WEIGHT: 18,510 lbs.(8 396 kg)

MOTOR: CGE 1213PA
HORSEPOWER: 140(104.4 kW)
AXLES: 2
SEATING: 44

BUILT: 1948
DELIVERY: 1974
WITHDRAWN: N/A
DISPOSAL: 1974
REMARKS: FROM CALGARY, ex 453 & 454

BUS NUMBER: N/A SERIAL NUMBER: 49-5688

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm) MOTOR: CGE 1213PA
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 140(104.4 kW)
HEIGHT: 10'5"(3 175 mm) AXLES: 2
WEIGHT: 18,510 lbs.(8 396 kg) SEATING: 44

BUILT: 1949 WITHDRAWN: N/A
DELIVERY: 1974 DISPOSAL: 1974
REMARKS: FROM CALGARY, ex 466

BUS NUMBER: N/A SERIAL NUMBER: 49-5691

MFR/MODEL: CCF-BRILL, T-44

LENGTH: 36'1"(10 998 mm) MOTOR: CGE 1213PA
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 140(104.4 kW)
HEIGHT: 10'5"(3 175 mm) AXLES: 2
WEIGHT: 18,510 lbs.(8 396 kg) SEATING: 44

BUILT: 1949 WITHDRAWN: N/A
DELIVERY: 1974 DISPOSAL: 1974
REMARKS: FROM CALGARY, ex 469

BUS NUMBER: N/A SERIAL NUMBER: 50-8161

MFR/MODEL: CCF-BRILL, T-48A

LENGTH: 38'9.5"(11 824 mm) MOTOR: CGE 1213PA
WIDTH: 8'6"(2 591 mm) HORSEPOWER: 140(104.4 kW)
HEIGHT: 10'6.25"(1 263 mm) AXLES: 2
WEIGHT: 19,170 lbs.(8 696 kg) SEATING: 48

BUILT: 1950 WITHDRAWN: N/A
DELIVERY: 1974 DISPOSAL: 1974
REMARKS: FROM CALGARY, ex 477

BUS NUMBER: N/A | SERIAL NUMBER: 50-8163 & 50-8164

MFR/MODEL: CCF-BRILL, T-48A

LENGTH: 38'9.5"(11 824 mm) | MOTOR: CGE 1213PA
WIDTH: 8'6"(2 591 mm) | HORSEPOWER: 140(104.4 kW)
HEIGHT: 10'6.25"(1 263 mm) | AXLES: 2
WEIGHT: 19,170 lbs.(8 696 kg) | SEATING: 48

BUILT: 1950 | WITHDRAWN: N/A
DELIVERY: 1974 | DISPOSAL: 1974
REMARKS: FROM CALGARY, ex 479, 480

BUS NUMBER: N/A | SERIAL NUMBER: 50-8320 & 50-8321

MFR/MODEL: CCF-BRILL, T-48A

LENGTH: 38'9.5"(11 824 mm) | MOTOR: CGE 1213PA
WIDTH: 8'6"(2 591 mm) | HORSEPOWER: 140(104.4 kW)
HEIGHT: 10'6.25"(1 263 mm) | AXLES: 2
WEIGHT: 19,170 lbs.(8 696 kg) | SEATING: 48

BUILT: 1950 | WITHDRAWN: N/A
DELIVERY: 1974 | DISPOSAL: 1974
REMARKS: FROM CALGARY, ex 481, 482

Appendix II

This Appendix consists of an example of correspondence between the author and one private company. The articles of correspondence illustrate the manner in which the author approached companies and individuals for research material and assistance. The Appendix also shows how helpful, kind and considerate most companies and individuals were in providing the author with research materials.

11752 Univ. Ave.,
Edmonton, Alberta
Canada T6G 1Z5
February 17, 1979

Mack Trucks Inc.
2100 Mack Blvd.,
Allentown, Pennsylvania, 18105

Dear Sir:

I am attempting to compile information, in order to write a thesis dealing with certain technical aspects of the Edmonton Transit System. One area of major importance, is the history of the trolley coach system. Your company supplied the Edmonton Street Railway (forerunner of the present system) with three, forty-passenger trolley coaches, in 1943. Those trolley coaches were some of the first to run in this city. Their fleet numbers were: 110, 111, 112. Their chassis numbers were: CR 1276, CR 1277, CR 1278. These coaches were used until 1965, when they were scrapped.

Aside from a few letters that the transit system has saved, very little reliable information remains here about the coaches. I would like to know any information that you might have about them. I am specifically interested in: blueprints, construction, electrical equipment, shop photos, exact delivery and construction dates, etc. I am willing to pay for a search fee, and for any reproduction. Please send the particulars to me, and I will reply right away. Reliable facts will make my work accurate. I remember frequently riding the Mack trolley coaches, but a thesis is not composed of recollections. I hope that you can help me, and I await your reply with interest.

Yours truly,

(signed)

George H. Buck

MACK TRUCKS, INC.
One of The Signal Companies

April 24, 1979

Mr. George H. Buck
11752 University Ave.
Edmonten, Alberta
CANADA T6G 1Z5

Dear Mr. Buck:

Your letter of February 17, 1979, requesting information on trolley coaches in 1943 was referred to my office for reply.

Unfortunately, the chassis records for these coaches (CR 1276, 1277, 1278) are not available. I was able to find out the coaches were delivered February 14, 1943.

Attachments are as follows:

1. Standard Specification-Mack Model CR Trolley Coach
2. Sales Brochure
3. Chassis Drawing - 14RT454
4. Photos
   a. CR-1277-143V6204
   b. CR-1277- 143V6205

If I can be of further assistance, please don't hesitate to contact me.

Very truly yours,

MACK TRUCKS, INC.

R W Williams Jr.

R. W. Williams, Jr.
General Engineering

djs

Attach.

11752 Univ. Ave.,
Edmonton, Alberta
Canada T6G 1Z5
May 8, 1979

Mr. R. W. Williams Jr.
General Engineering
Mack Trucks Inc.,
P.O. Box 1761,
Allentown, Pa. 18105

Dear Mr. Williams:

I would like to thank you very much for the time and trouble you took in locating the superlative information on the three Edmonton CR trolley coaches. This information is exactly what I was hoping to find. Many questions that I had, were answered by the specifications and the brochure, and a previous belief was refuted by the photographs. It was maintained, by some, that the Mack trolley coaches arrived in Edmonton in a matt grey paint scheme. Your photographs show that the coaches arrived in Edmonton in the Edmonton Street Railway's colors. I have enclosed a photograph of Number 111 (CR 1277) in service in Edmonton, in July of 1943. It is on route 6, northbound on Scona Road, and passing an army detail. I assume, that since you said that the coaches were delivered in February 1943, they were actually constructed in late 1942.

In John Montville's book entitled Mack, he states that the model CR trolley coach was produced from 1934 to 1943. Was Edmonton's order the last CR coaches made? If it is too time consuming to find the answer, do not bother, as it is not an essential point.

Shortly after I wrote my original letter (February 17), I discovered that the Edmonton Transit System purchased, from your company in 1951, six diesel buses. Unfortunately, even less material exists about them than exists about the CR trolley coaches. I have been unable to find any record of their chassis numbers, or even the model number. An E.T.S. service roster lists them as fleet numbers 94 to 99, and as "36-passenger". According to John Montville's book, Mack never produced a 36 seater diesel bus. My guess, is that the model was either C-33, or C-37. The buses were apparently sold in 1964 to some unknown company, and all the records were sold with them. If it is not too much trouble or bother, could you find some information on these buses? These buses, and the CR trolley coaches, were the only Mack vehicles purchased by the transit system.

I thank you again for your work, time, and information, as well as for making my research and thesis a great deal easier.

Very truly yours,

(signed)

George H. Buck

MACK TRUCKS, INC.
One of The Signal Companies

June 11, 1979

Mr. George H. Buck
11752 University Ave.
Edmonton, Alberta
CANADA T6G 1Z5

Dear Mr. Buck:

Thank you for your complimentary remarks in your correspondence dated May 8, 1979. I am always happy to assist whenever possible.

Regarding your question about the CR coaches, I was able to find out Edmonton's order was, in fact, the last order for CR coaches filled.

The six diesel buses you referred to are Model C-37. The chassis and building record indicates the buses were delivered for service to the City of Edmonton November 16, 1951.

Attachments are as follows:

1. Copy of chassis record
2. Catalog-Mack Bus Models C-33 & C-37
3. Photos - C37DT1296-1151C6208 thru C37DT1296-1151C6214

Thank you for your continued interest in Mack. If you have need of further assistance in your research, please contact me.

Good Luck!

Very truly yours,

R W Williams Jr.

R. W. Williams, Jr.
General Engineering

djs/Attach.